BIOS SECRETS REVEALED!

Our most in-depth white paper—*EVER*

DIGI-CAM FACEOFF!

We name the **BEST** 4-megapixel camera

MAXIMUM PC

AUGUST 2003

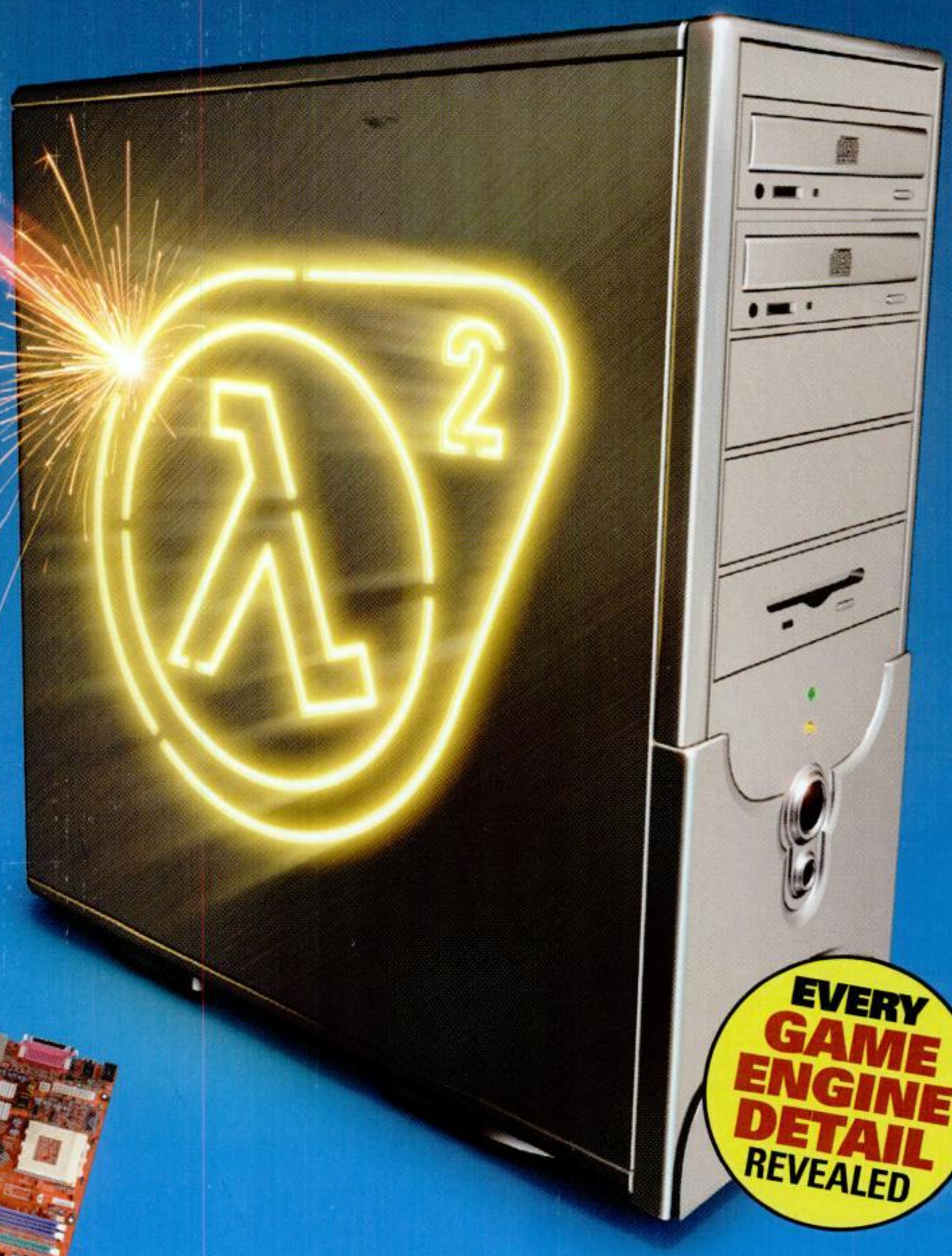
MINIMUM BS

HALF-LIFE 2

It's the **GAME of the YEAR!**

But can your videocard play its ground-breaking graphics?

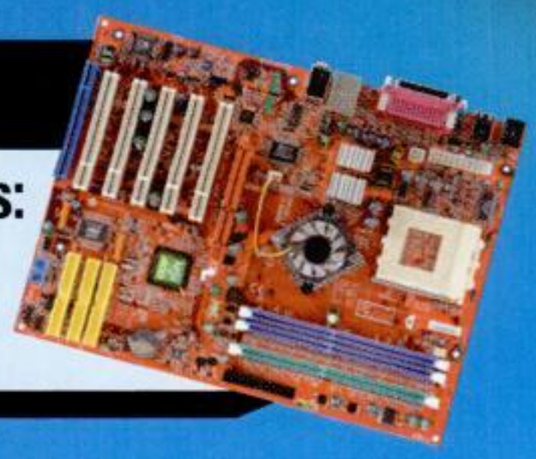
We rank your PC's Half-Life 2 potential!



EVERY GAME ENGINE DETAIL REVEALED

Mobo Showdown

6 hardcore motherboards: Reviewed, rated and ripped asunder!



Hardware Upgrading 101

How to install new memory, videocards & storage drives. Every step explained!

$8.99US $10.99CAN

08

0 74808 03353 9

future network USA
Media with Passion

Out of the tombs. Into hell.

New 3D Engine and character control take full advantage of Nvidia technology.

Stealth and hand-to-hand attacks help remove anyone in your path.

The gritty urban underbelly of Europe offers whole new environments.

Player/character, Kurtis Trent, brings his own distinct gameplay mechanics.

A bloody crime scene. A ritual killing. A shocking suspect. And so the daring pursuit of good becomes the desperate flight from evil. And if the dark forces arrayed against her believe she's incapable of the ultimate, they're about to learn a painful lesson: Payback's a bitch.

TEEN T CONTENT RATED BY ESRB — Blood Violence

The way it's meant to be played — NVIDIA

PC CD

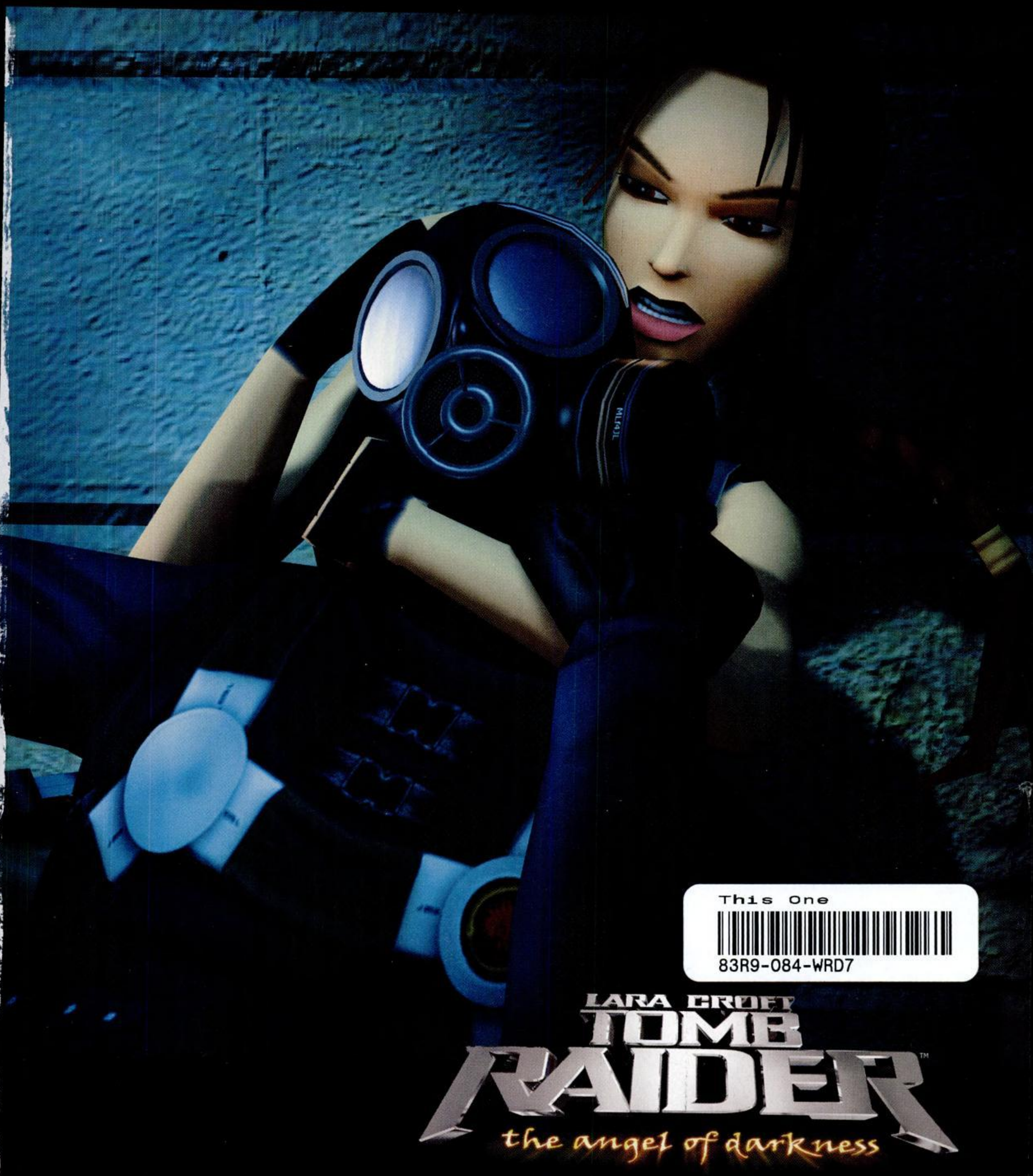
core design

EIDOS INTERACTIVE

tombraider.com

© 2003 Core Design Limited. Lara Croft, Tomb Raider and Core are registered trademarks of Core Design Ltd. Lara Croft Tomb Raider: The Angel of Darkness, the Tomb Raider logo and the Core Design logo are trademarks of Core Design Ltd. Eidos Interactive and the Eidos logo are trademarks of the

Copyrighted material

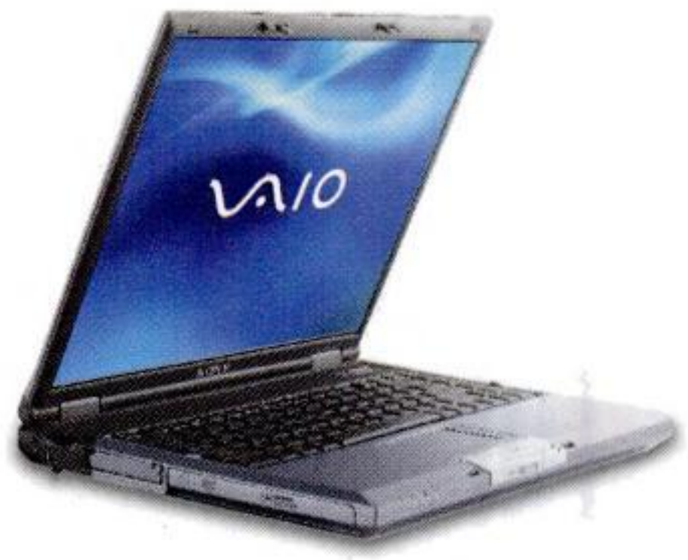


Eidos Group of Companies. All rights reserved. NVIDIA, the NVIDIA logo, The Way It's Meant to be Played Logo, are registered trademarks or trademarks of NVIDIA Corporation in the United States and/or other countries. The ratings icon is a registered trademark of the Interactive Digital Software Association.

Copyrighted material

SONY

{GRT series Notebook PC}



Productive Multimedia Power.

Starting at $999.99

- *Mobile Intel® Celeron® processor at 1.80 GHz[1]*
- *Microsoft® Windows® XP Home Edition*
- *256 MB RAM*
- *14.1" XGA Display*
- *30 GB HDD[2]*
- *CD-RW/DVD Combo Drive*
- *Sony exclusive digital editing software package*
- *1-Year Limited Warranty[3]*

Burn DVDs. Be Creative.

Nicely Equipped $1,999.99

- *Intel® Pentium®4 processor 2.80 GHz[1]*
- *Microsoft® Windows® XP Home Edition*
- *Integrated Wireless LAN[6]*
- *512 MB RAM*
- *16.1" SXGA+Display*
- *60 GB HDD[2]*
- *DVD+/-RW Dual Format Drive[4]*
- *Sony exclusive digital editing software package*
- *1-Year Limited Warranty[3]*

Call to customize a GRT series PC just for you.

{V505 series Notebook PC}

Stylish Mobility. Serious Power.

Starting at $1,479.99

- *Mobile Intel® Celeron® processor at 1.80 GHz[1]*
- *Microsoft® Windows® XP Home Edition*
- *Under 4.4lbs.[5]*
- *256 MB RAM*
- *12.1" XGA Display*
- *40 GB HDD[2]*
- *CD-RW/DVD Combo Drive*
- *Sony exclusive digital editing software package*
- *1-Year Limited Warranty[3]*

Wireless Mobility. Serious Power.

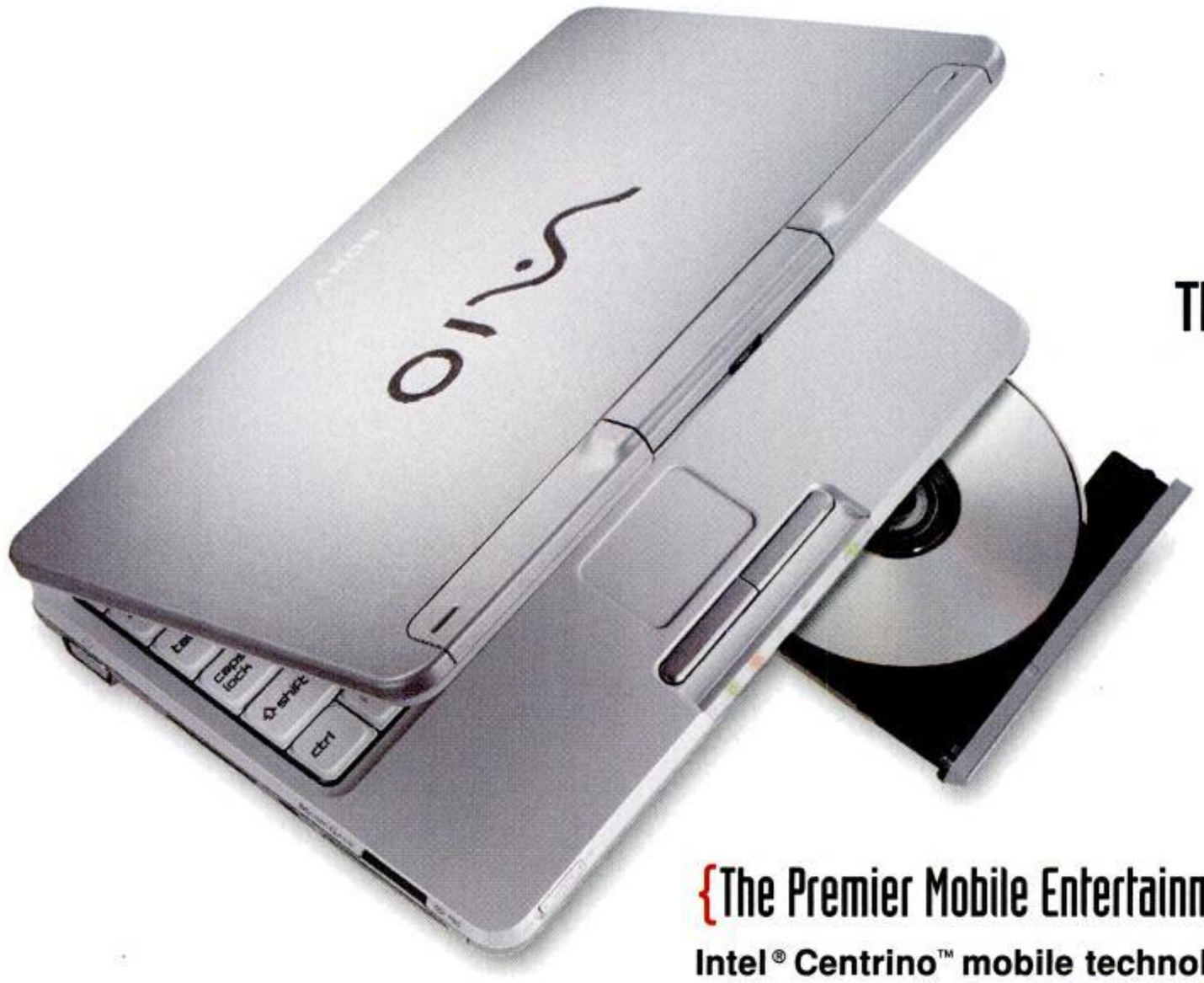
Nicely Equipped $2,339.99

- *Mobile Intel® Pentium® 4 processor 2.40 GHz[1] – M*
- *Microsoft® Windows® XP Home Edition*
- *Integrated Wireless LAN[6]*
- *Under 4.4lbs.[5]*
- *512 MB RAM*
- *12.1" XGA Display*
- *60 GB HDD[2]*
- *CD-RW/DVD Combo Drive*
- *Sony exclusive digital editing software package*
- *1-Year Limited Warranty[3]*

Call to customize a V505 series PC just for you.

Copyrighted material

Smaller. Stronger. Smarter. Sony.



TR1A

{The Premier Mobile Entertainment PC}

Intel® Centrino™ mobile technology. *Extra bright, wide-screen display. Watch DVDs. Swivel camera. Your 3-lb. travel companion.*

Starting at just $1,999.99

Sony recommends Microsoft® Windows® XP

Call Sony for your customized notebook PC.

For years Sony has been defining and redefining mobile entertainment. For music. For video. And for computing. We've raised the bar again with our collection of sleek, ultra-functional notebook PCs with Intel® processors. From built-in wireless to burning DVDs, enjoy the power and mobility you need to go anywhere. Just what you'd expect from Sony. And our trained specialists can help you create the PC that's just right for you. With all the features you crave. And nothing you don't. We'll even help with financing. So call today.

CALL SONY TODAY. 1-866-382-SONY

www.sonystyle.com

centrino™ MOBILE TECHNOLOGY

FREE SHIPPING AND FREE PRINTER

Get free shipping and a free EPSON stylus printer[7] [after mail-in rebate] when you buy an eligible PC direct from Sony.

©2003 Sony Electronics Inc. Reproduction in whole or in part without written permission is prohibited. All rights reserved. Sony and VAIO are trademarks of Sony. Intel, Intel Inside, the Intel Inside logo, Intel Centrino, the Intel Centrino logo, Pentium and Celeron are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. Microsoft and Windows are trademarks of Microsoft Corporation. All other trademarks are trademarks of their respective owners. Features, prices, specifications, availability and promotions are valid only in the U.S. and are subject to change without notice. Prices and promotions do not include applicable sales tax or shipping and handling. Retailer price may vary. Sony is not responsible for typographical or other errors in this ad. [1]GHz denotes microprocessor internal clock speed; other factors may affect application performance. [2]GB means one billion bytes when referring to hard drive capacity. Five GB of hard disk space is reserved as a recovery partition. Accessible capacity may vary. [3]From date of purchase with registration. Certain restrictions apply. [4]DVD compatibility is not universal. [5]With supplied battery. [6]Terms of wireless access vary and fees and coverage limitations may apply. [7]Printer model may vary. Offer expires 12/31/03. Screen images simulated.

Copyrighted material

AWAKEN TO THE ACOUSTIC REALISM OF

Sound BLASTER AUDIGY 2™

ENTER THE MATRIX™

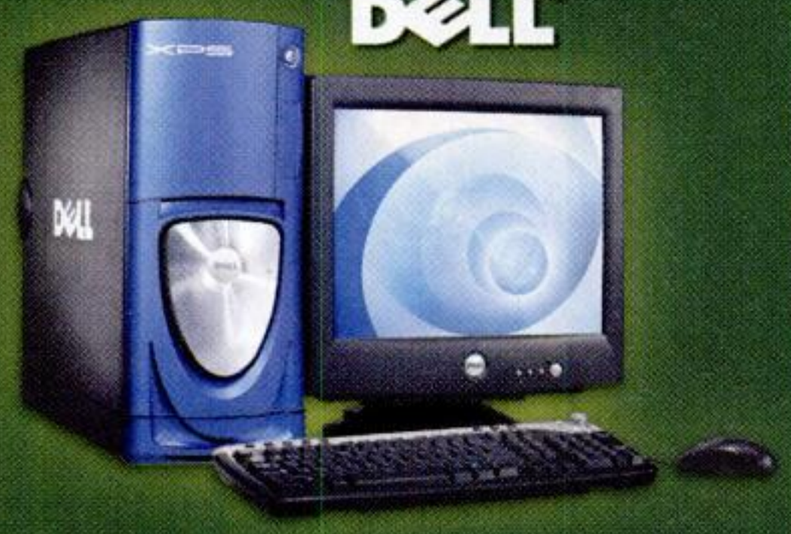
SOUNDS BEST ON Sound BLASTER 24-bit ADVANCED HD

Experience EAX® ADVANCED HD™ in Enter the Matrix™

No one can be told what Enter the Matrix™ sounds like on a Sound Blaster® Audigy™ 2 sound card. You have to hear it for yourself. With 24-bit ADVANCED HD™ audio quality and EAX® ADVANCED HD™ technology, experience lifelike sound and dramatic effects just like in the real world. The THX® certified Sound Blaster® Audigy™ 2 also delivers 6.1 surround in Enter the Matrix™ and over 400 other 3D games. For more information, visit **www.soundblaster.com**

Sound Blaster® Audigy™ 2 is featured in the NEW Dimension™ XPS Gaming PC from

DELL™



www.dell4me.com/audigy2

LUCASFILM THX

EAX ADVANCED HD™

CREATIVE®

©2003 Creative Technology Ltd. and Dell Computer Corporation. All rights reserved. The Creative logo is a registered trademark of Creative Technology Ltd. in the United States and/or other countries. Dell, the Dell Logo, and Dimension are registered trademarks of Dell Computer Corporation. All brands or product names listed are trademarks or registered trademarks and are property of their respective holders.

Enter The Matrix video game ©2003 Warner Bros. and Atari, Inc. All rights reserved.

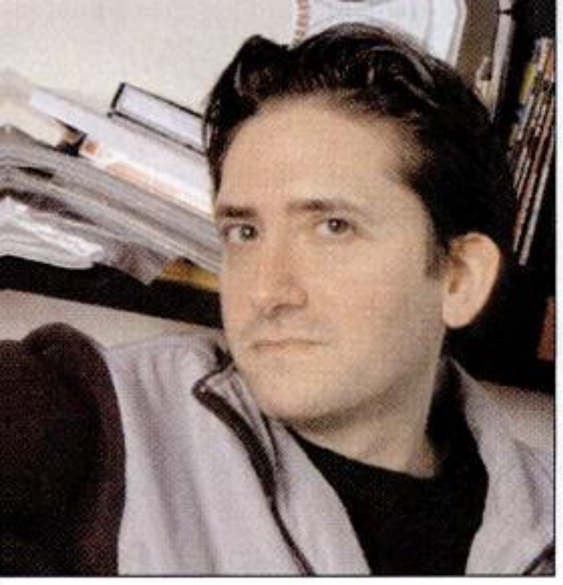
™ Warner Bros.
© Warner Bros. – U.S., Canada, Bahamas & Bermuda (s03)

© Village Roadshow Films (BVI) Limited – All Other Territories

VILLAGE ROADSHOW PICTURES

ATARI

Copyrighted material



Release Notes

Introducing the nVidia Seymour

Ah, August, glorious August. The days are long, the weather is warm, and peltier coolers are dewy in the morning. Kind of makes you want to take off your shoes and walk barefoot, doesn't it? Maybe. Perhaps. If you're a *Maximum PC* editor stuck in the Lab, furiously working away on pencil sketches for Dream Machine 2003, a barefoot walk through shards of discarded motherboards could lead to nasty cuts. We're going to have to clean that Lab one of these days....

Sure, you might just be reading the August issue, but Dream Machine 2003 (to be revealed next month) is already being mapped out conceptually. In fact, our editors established performance goals a few months ago, and then started calling their industry contacts for exclusive parts. Our mission is to configure the most outrageous hand-built PC possible, and that means getting key components that will be absolute surprises to our readers. Last year, our special hardware coup was the ATI Radeon 9700. Not only was *Maximum PC* the first magazine to publish 9700 benchmarks, we also had an overclocked version of the card that helped Dream Machine 2002 achieve a particularly special level of greatness.

All of which leads us to the videocard question for Dream Machine 2003: Will it run an ATI Radeon 9800 Pro 256MB or an nVidia GeForce FX 5900 Ultra 256MB? Or perhaps a new card that hasn't yet been announced?

Don't get us wrong. We'd love to have experimental silicon stuffed into DM2003's AGP slot, but we're concerned about the product's name. With the name "9800," ATI is running out of breathing room, and we just don't see a "Radeon 10000" on the horizon. That's just too many zeroes. How about the "Radeon O'Reilly" or the "Radeon IROC-Z Edition" or the "Radeon Shabba-Dabba Doo-Wop"? We'll settle for anything that rolls of the tongue better than "Radeon 9800 Pro 256MB."

Of course, the good people at nVidia have their own problems. The name "GeForce FX 5900 Ultra 256MB" is probably 10 or 15 characters too long (and we've heard more euphonious phonetic combinations coming from Max Cady in the final scene of *Cape Fear*.). Will we see a GeForce FX *6000* Ultra 256MB next month? We certainly hope we see something new from either nVidia or ATI. Except we'll probably just save ourselves all the tongue-twisting, and call it Seymour.

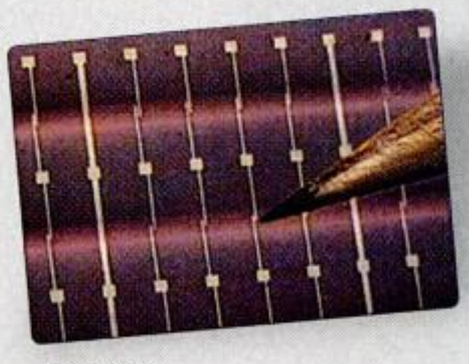
This month, I want to formerly thank all the vendors that are helping *Maximum PC* support the case modding scene. CompUSA is offering a whopping $3,000 shopping spree for our just announced "Coolest PC" case modding contest, and our Rig of the Month section now has a monthly sponsor: The people who brew the BAWLS energy drink will send $500 and a case of BAWLS to whomever is chosen as our monthly master craftsperson.

—JON PHILLIPS

Contents

08.03

Page 58



Page 18

Page 22

REGULARS

08 In/Out
nVidia is taken to task—on *two* counts; a reader questions our sense of patriotism; and, boy oh boy, were we wrong about Lieutenant Uhura.

14 Quick Start
PC previews, news, factoids... and a sneak-peek at Longhorn—Microsoft's latest OS.

22 Head2Head
Two compact digital cameras enter, but only one leaves.

24 WatchDog
nForce2: Will it or will it not support 400MHz? Is Arena Computers still out there? And, can any more be said about the definition of gigabyte? These questions and others answered.

54 Ask the Doctor
This month the Doctor gets all hands-on with clock- speed readings, Gator ad-ware, and DVD burning. Plus more on videocards!

50 How To...
Easily install or upgrade your PC's RAM, hard drives, optical drives, and PCI or AGP cards. Really.

96 Rig of the Month
If it were in the same room with us, we'd fear for the lives of our unborn offspring.

REVIEWS

60 High Power HellFire 2 desktop system
61 Velocity Raptor desktop system
62 D-Link CompactFlash Wireless Adapter
62 Linksys USB Wireless Adapter
62 SiPix StyleCam Blink II digicam
62 MADLights LED lighting kit
63 TDK indiDVD Dual-Format DVD burner
63 Bantam BA800 MP3 player
64 Palm Tungsten C PDA
64 Palm Zire 71 PDA
65 Yamaha EZ-EG guitar
65 Bafo SoulDrum drum kit
66 Thermaltake Xaser III case
66 iBuyPower RaidCom case
67 Archos AV320 multimedia player
68 Snapstream Personal Video Station 3
69 Enter the Matrix
69 Sims Superstar Expansion Pack
72 Planetside
72 Tropico 2: Pirate Cove

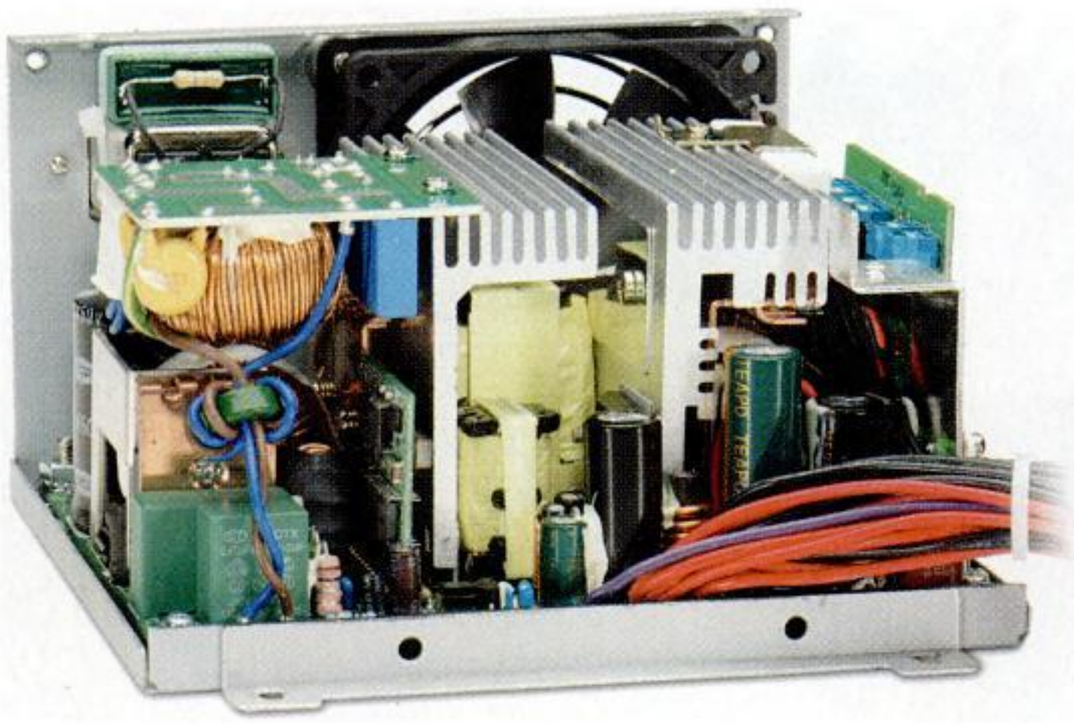
Page 65

Page 66

Page 69

Copyrighted material

The Turbo-Cool® 510 Provides 40%-60% More +12V Power for CPUs and Drives!

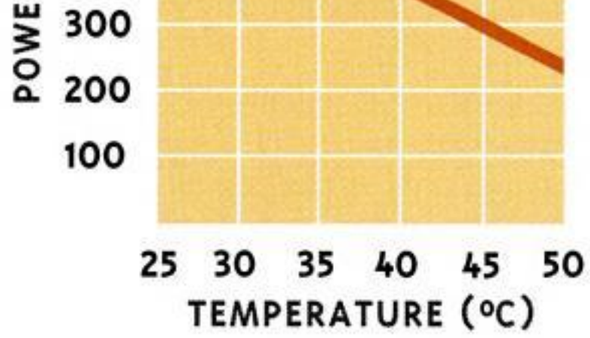
	Turbo-Cool® 510	So-Called 550	
			
Power @ 25°C:	**600W**	**550W**	Rating requires room temp. < 60°F
Power @ 40°C:	**510W**	**366W**	**True rating** (40°C is typical P.S. temp)
Power @ 50°C:	**460W**	**244W**	50°C is the spec for an industrial PC
+12V Output:	**34A***	**24A**	*38A peak. Powers CPUs and drives
Regulation:	**1%**	**5%**	875 M/Bs need stable voltages to run
System Cooling:	**44 cfm**	**40 cfm**	Tests show "550's" 2nd fan is ineffective
Active PFC:	**Yes**	**No**	Continuous range line conditioning
Voltage Pots:	**Yes**	**No**	Adjustments for system fine tuning
Intel Approved:	**Yes**	**No**	Turbo-Cool 510 tops Intel's ATX12V list
Warranty:	**5-Years**	**1-Year**	Reliability and longevity indicator

Turbo-Cool® 510 is the Expert's Choice.

Turbo-Cool power supplies have powered Maximum PC's Dream Machines for the last five years and are recommended by manufacturers such as Asus, SM, Tyan, and Intel. Follow the pros. Put a Turbo-Cool in your dream machine!

NEW! 510 Deluxe

Don't be Mislead by Wattage Claims!



*Even though the ambient temp. in a power supply is at least 40°C (104°F), most manufacturers unrealistically assume 25°C (77°F) in order to exaggerate their wattage claims. Since the proper full-load rating is 15°C higher, these power supplies produce **33% less power than their advertised ratings** as shown on the derating chart.*

Turbo-Cool 510 derating spec: *full load @ 40°C, decrease to 90% load @ 50°C.*
So-Called 550 manufacturer's spec: *full load @ 25°C, decrease to no load @ 70°C.*

PC POWER & COOLING, INC.

High-Performance Computer Power Supplies Since 1985

www.pcpowercooling.com • 5995 Avenida Encinas, Carlsbad, CA 92008 • (760) 931-5700 • (800) 722-6555

Complete specifications and pricing available on website. Turbo-Cool is a registered trademark of PC Power & Cooling, Inc. ©2003

Copyrighted material

MAXIMUM PC

EDITORIAL
Jon Phillips EDITOR-IN-CHIEF
Katherine Stevenson MANAGING EDITOR
Gordon Mah Ung SENIOR EDITOR
Will Smith TECHNICAL EDITOR
Logan Decker FEATURES EDITOR
Greg Vederman DISC EDITOR
Andrew Sanchez EDITOR EMERITUS

ART
Natalie Jeday ART DIRECTOR
Boni Uzilevsky ASSOCIATE ART DIRECTOR
Mark Madeo PHOTO EDITOR

CONTRIBUTING EDITORS
Tom Halfhill, Dwight Looi
Thomas McDonald, Robert Moseley

CONTRIBUTING WRITERS
Jason Compton, Sixto Ortiz

CONTRIBUTING ILLUSTRATOR
Oliver Wolfson

PRODUCTION
Richard Lesovoy PRODUCTION DIRECTOR
Lawrence Briseno PRODUCTION COORDINATOR

ADVERTISING
Chris Coelho PUBLISHER
Bernard Lanigan EASTERN AD DIRECTOR
212.768.2966 EXT. 4001
Dave Lynn WESTERN AD DIRECTOR
949.360.4443
Stacey Levy NATIONAL SALES MANAGER
925.964.1205
Sharon Kiernan DIRECT SALES MANAGER
781.416.2018
Nate Hunt NATIONAL ACCT MANAGER
415.656.8536
Jose Urrutia ADVERTISING COORDINATOR
415.656.8313
Alison McCreery SENIOR MARKETING MANAGER

CIRCULATION
Tina K. Rodich GROUP CIRCULATION DIRECTOR
Angela Martinez NEW BUSINESS DIRECTOR
Mimi Hall NEWSSTAND MANAGER
Janet Amistoso DIRECT MARKETING SPECIALIST

BACK ISSUE REQUESTS
1.800.865.7240

REPRINTS PRINT AND DIGITAL
Reprint Management Services
Maggie French, 717.399.1900 x178
mfrench@reprintbuyer.com

How to contact us:
All subscription Inquiries 800.274.3421 or
maxcustserv@cdsfulfillment.com
Editorial staff input@maximumpc.com

future network usa
Media with Passion

FUTURE NETWORK USA
150 North Hill Dr. Brisbane, CA 94005
415.468.4684 www.futurenetworkusa.com

CHIEF EXECUTIVE Greg Ingham
PRESIDENT Jonathan Simpson-Bint
VICE PRESIDENT/CFO Tom Valentino
VP/EDITORIAL DIRECTOR Matt Firme
VICE PRESIDENT/CIRCULATION Holly Klingel
GENERAL COUNSEL Charles Schug
DIR. OF CENTRAL SERVICES Nancy Durlester

Future Network USA is aimed at people who have a passion. A passion for games. For business. For computers. Or for the Internet. These are passions we share. Our goal is to feed your passion with the greatest magazines, web sites, and CD-ROMs imaginable. We love to innovate, we love to have fun, and we have a cast-iron rule always to deliver spectacular editorial value. That means doing whatever it takes to give you the information you need. With any luck, we'll even make you smile sometimes. Thanks for joining us.

Future Network USA is part of The Future Network plc. The Future Network plc serves the information needs of groups of people who share a passion. We aim to satisfy their passion by creating magazines and web sites that offer superb value for money, trustworthy information, multiple ways to save time and money, and are a pleasure to read or visit. This simple strategy has helped create one of the fastest-growing media companies in the world: we publish more than 100 magazines, 20 magazine web sites, and a number of web networks from offices in five countries. The company also licenses 42 magazines in 30 countries. The Future Network is a public company quoted on the London Stock Exchange (symbol: FNET).

BATH LONDON MILAN MUNICH NEW YORK PARIS SAN FRANCISCO

AUGUST FEATURES

26 Half-Life 2: Can your PC hang?
Does your hardware have the huevos to handle *Half-Life 2*? Our full technology guide and game engine primer will help you determine if your PC can render all the effects in their ever-loving glory.

34 Enter the BIOS
What kind of hanky-panky goes on behind the scenes during the first 30 seconds of your PC's life? Inside: All BIOS mysteries revealed!

41 Mobo Mania
Motherboard lovers, rejoice! We give you six juicy reviews to help you pick the best board for your new Pentium 4 or Athlon XP system.

MAXIMUM PC (ISSN 1522-4279) is published monthly by Future Network USA, 150 North Hill Drive, Suite 40, Brisbane, CA 94005, USA. Periodical class postage paid in Brisbane, CA, and at additional mailing offices. Newsstand distribution is handled by Curtis Circulation Company. Basic subscription rates: one year (12 issues) US: $20; Canada: $26; Foreign: $42. Basic subscription rates "Deluxe" version (w/CD): one year (12 issues/12 CD-ROMs) U.S.: $30; Canada: $40; Foreign $56. US funds only. Canadian price includes postage and GST (GST#R128220688). Postmaster: Send changes of address to Maximum PC, P.O.Box 5159, Harlan, IA 51593-0659. Standard Mail enclosed in the following edition: none. Ride-Along enclosed in the following editions: B, C, C1, C2, C3. Int'l Pub Mail# 0781029. For customer service, write Maximum PC, P.O. Box 51479, Boulder, CO 80328-1479; Maximum PC, 150 North Hill Drive, Brisbane, CA 94005. Future Network USA also publishes PC Gamer, PSM, MacAddict, and Official Xbox. Entire contents copyright 2003, Future Network USA. All rights reserved. Reproduction in whole or in part is prohibited. Imagine Media Inc. is not affiliated with the companies or products covered in Maximum PC. PRODUCED AND PRINTED IN THE UNITED STATES OF AMERICA.

Copyrighted material

In/Out

You write, we respond

CAN ANY 3D VENDOR BE TRUSTED?

In your July 2003 issue, you reviewed both a GeForce FX 5900 Ultra 256MB and the ATI All-in-Wonder 9800 Pro. You gave both a Kick Ass award. Yet I've been reading about how nVidia cheated on its drivers to make *3DMark2003* run 25 percent faster than normal. Then the people who make the benchmark [Futuremark] said nVidia was cheating, and changed their software to stop the nVidia drivers from working. Futuremark also said ATI wasn't in the clear either.

Did you use the [original nVidia] drivers to test the GeForce FX in your review, and what do you think about the numbers you got now? And should I still consider buying a videocard from a company that has done this type of thing?

My other problem is that I know ATI has done similar cheating in the past. So if everyone is cheating on drivers, whom do I trust. As far as I know, only *Maximum PC*.

—DAVID ASHTON

TECHNICAL EDITOR WILL SMITH RESPONDS: We found out about the nVidia driver issue two days after we sent the July issue to press—drat! If we were lucky enough to be beta testers for Futuremark, we would have discovered the driver issues ourselves (they're apparent only in the developer's version of the benchmark), and we would have been able to weigh in on this controversy much earlier.

ATI and nVidia have done several different tweaks to enhance their *3DMark2003* scores, and we think some are totally legitimate and others are clearly dubious. Both companies have rearranged the sequences in which shader operations run in order to make the benchmark perform better on their hardware. This is a standard compiler optimization for code that runs on the CPU, and we don't really have a problem with it because it makes the game run faster without affecting image quality.

In its controversial drivers, nVidia also added clip planes to the Game 4 benchmark in *3DMark2003*. These clip planes prevent the card from drawing parts of the Game 4 scene—parts that would be visible if the benchmark were a real game. nVidia defined the clip planes as being "aggressive optimizations," but added that the tweak is "too aggressive" and would be removed from future iterations of the driver. We discuss the controversy in detail on page 58.

If you want to buy a 3D card from a company that's never been busted for dubious driver optimizations that skew benchmarking results, you won't have much to choose from. Just about every 3D accelerator manufacturer has been caught cheating.

> *"THE IDEA OF EXCLUSIVE CONTENT FOR NVIDIA OWNERS OFFENDS ME. SICKENS ME, EVEN."*

PC GAMERS AREN'T CONSOLERS—EXCLUSIVE CONTENT DOESN'T FLY

I just read your article about EA and nVidia forming an alliance to create exclusive content for EA games running on nVidia cards [Quick Start, June 2003]. Up until about a month ago, when I purchased the ATI 9500 Pro, I had only used nVidia cards. I liked the performance and the reference drivers that nVidia supplied. As with most hardware geeks, I like to find a brand of hardware that works, and stick with it. Unfortunately nVidia has been lacking lately, so I decided to try ATI for a change. I'm happy with the ATI card, but until reading your article I hadn't ruled out going back to nVidia in the future. Pardon my language but this "alliance" is bullshit.

Whatever happened to getting people to buy your stuff by providing a good product with dependable service? I'm not saying that nVidia hasn't done this, but to blackmail gamers like myself in this manner is inexcusable. It sounds like nVidia has been taking marketing lessons from Bill Gates. I can honestly say that I will never purchase another nVidia product again.

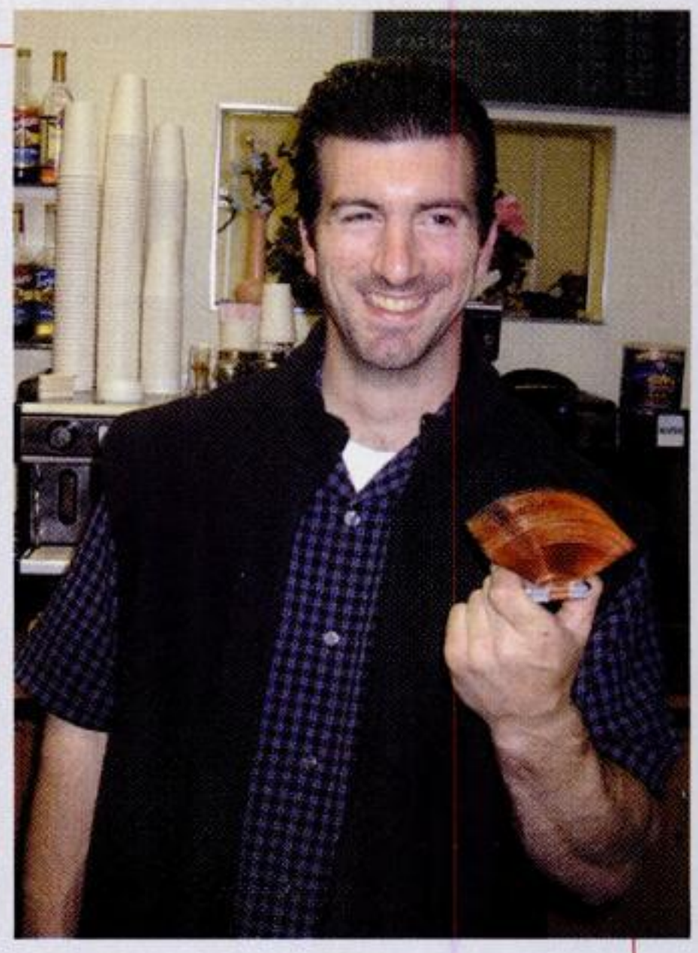
—MICHAEL BENSON

Your article about EA and nVidia making exclusive content really got me riled. I'm a long-time user of nVidia products, from the TNT all the way to my present 4200. I've always recommended nVidia products to my customers, and have never had compatibility problems as I've had with some ATI cards. That said, the idea of exclusive content for nVidia owners offends me. Sickens me, even. This just may just be enough to sway my next purchase towards ATI. I mean, how would nVidia feel if id decided to release *Doom3* for ATI cards only (or a week earlier for ATI cards)? Pull your heads out of the sand nVidia, and stop biting the hands that feed you.

—NEIL PRIDGEON

continued on page 10

THE DINGUS ATE MY MOBO!



What a surprise, what a treat it was, to see that particular dingus in your In the Lab section of June's issue. Anyone with half a CPU knows what that wassamallit is. That particular busket snotch caused me great disappointment at one time. I was trying to mount the dingus, and guess what, couldn't do it. Why? Because of the mobo caps, man, the damn caps on the fargin mobo are too close to the CPU to allow my dingus to sit snugly and silently doing is shtuff.

The base on my dingus is big enough to cover half the state of Montana, and its footprint covers the caps, so short of using a hammer to modify their position, I had to revert to the standard P4 unit. Bummer. So I have a spare dingus just like you guys do. It's comforting to know I'm not alone.

—ANDY SALTIS

Copyrighted material

DAY OF DEFEAT™

World War II Online Action From the Makers of Counter-Strike™!

★ IN STORES NOW ★

Connect with voice support.

Battle with authentic artillery.

Play WWII's greatest battles.

VALVE

© 2003, Valve L.L.C. Day of Defeat, the Day of Defeat logo, Valve, the Valve logo and Counter-Strike are trademarks or registered trademarks of Valve, L.L.C. Published and distributed by Activision Publishing, Inc. Activision is a registered trademark of Activision, Inc. and its affiliates. All rights reserved. The ratings icon is a registered trademark of the Interactive Digital Software Association. All other trademarks and trade names are the properties of their respective owners.

ACTIVISION®

continued from page 8

EDITOR-IN-CHIEF JON PHILLIPS REPLIES: These letters represent a small sample of e-mails criticizing the nVidia-EA announcement. No one sent any e-mail expressing support for the two companies' "The Way It's Meant to be Played" program. We should also remind everyone that the program is still undefined, and there's no proof that any game stamped with the program logo turns off effects when running on ATI cards.

OCSYSTEM EXPLAINS ITS ERRORS

In the June 2003 issue, OCSystem's Orion Behemoth PC was reviewed negatively as being "overclocked or overcooked." We apologize to all the OCS fans out there. After a closer inspection of the review machine, we determined that a particular 520W power supply was causing all the crashes. The TEC peltier simply draws too much current out of the power supply at the 12v side, and this resulted in instability on the 3v and 5v side, which is used by the motherboard and everything plugged into it. A solution has already been implemented on all affected models.

We are ashamed of ourselves for the crashing of the power supply, and would like to extend our apologies to OCS fans out there. We are a company that stands behind our products with continuous improvement and support. Errors and mistakes only make us better and sharper at overclocking. After all, we still make the fastest gaming PC today.

—OCSYSTEM

IT'S NOT A CHUMP (IT'S FOURTH-BEST)

Just wanted to say "thanks a lot" for suggesting the 21-inch Sony E540 monitor in the April issue (endorsing it as a viable and intelligent choice), and then in the July issue reviewing four monitors, and letting us know that the E540 is the worst of the bunch. I bought the E540 on your suggestion in the April issue, now I feel screwed. I thought the world of you guys, and I must say I was so very disappointed and shocked to read the recent review. I upgrade my monitor on the longest cycle, and I thought I would do right by your suggestions, but now I'm stuck with a chump.

—ROB ABBOTT

EDITOR-IN-CHIEF JON PHILLIPS REPLIES: Rob, I can understand your chagrin. But I'd like to point out that the April issue article on choosing a budget CRT was not a review roundup. Instead, I was using the Sony product line to demonstrate a very specific point: That when it comes to 21-inch CRTs, you pay an expensive premium for pro-level resolutions, refresh rates, and image quality.

Is the extra quality worth the money? To some people, absolutely. But to many people, the relatively poor image quality of the E540 is inconsequential. As I wrote in my July review, the image quality of the E540 is fine for normal everyday tasks, and it's better than that of many expensive CRTs made a few years ago.

Again, I wasn't reviewing CRTs in April, but I can see how my enthusiasm for choosing an inexpensive monitor could be misinterpreted as a "buy recommendation" for the E540. In retrospect, I should have made it patently clear in the April issue that I wasn't endorsing any single monitor, save the kick-ass Sony F520.

LAPPING IT UP

I recently read an excerpt from the July cover story concerning lapping heatsinks. In the article, you suggest using 800-grit sandpaper to start with, and finishing with 1600-grit, and then polishing with a rotary tool. There are errors in this advice.

Starting with paper in the 200 to 400 range, depending on the initial quality of the heatsink, is best. This removes the worst defects quickly without adding any glaring scratches. Most modern high-performance heatsinks gain

Copyrighted material

little from going past 600- or 800-grit when lapping. Also, completing the heatsink lapping process with a rotary tool, or even using a buffing wheel and polishing compound, is counter-productive. Lapping must be done on a flat surface to be effective, and a rotary tool is not flat. Additionally, polishing compound will be left in the micropores of the heatsink thereby preventing thermal compound (which is a better conductor of heat than polishing compound) from transferring heat as effectively as it could.

Achieving a polished, shiny finish is not the point of lapping—flatness is. In fact, some will argue that a mirror-shined surface may not be as effective as one that is less shiny, although I have seen no definitive proof either way. If you wish to learn more on the art of lapping, I recommend checking out the **www.overclockers.com** web site

—DOUG GETGOOD

THEM'S A LOT OF BIG WORDS, DAVID

I have been a fan of your publication for some number of years now, always finding it to be the best cut-and-dry resource for tech info and unbiased reviews. However, I am exceptionally irritated by the recent flag-waving that has become a monthly installment in *Maximum PC*, under the pretense of "supporting the troops."

Patriotism—rampant, presumptuous, rah rah, red, white, and blue—is dyeing every publication I lay my eyes on. There comes a time when one has to question what is patriotic, and what is despotic. Why do I have a problem with the patriotic case mods in your magazine? Simply put, this is not why I buy your magazine, and it is beyond irritating to see a parroting of the hypocritical dogma of freedom so loosely espoused by our fearless leader and his contingent of war profiteers.

—DAVID L. NISHIZAKI

EDITOR-IN-CHIEF JON PHILLIPS REPLIES: I read every single word that is published in *Maximum PC*, and in my opinion, we have never expressed any support whatsoever for George Bush or any of his actions. Nor have we expressed disapproval. But I won't apologize for supporting the men and women of our armed forces. Soldiers literally put their lives on the line for crap pay, and often because some politician in Washington is moving his chess pieces by whimsy, and not by design. They deserve the entire nation's support for what is essentially a thankless job. Of course, so do public school teachers, but because their casualty rate is low relative to soldiers, they don't get quite the same amount of kudos in *Maximum PC*.

LET US PITY THE GREAT KING OF PIXELS

Thomas McDonald is correct in his review of *Masters of Doom*, the new book about id Software [Game Theory, July 2003]. The book not only puts real faces on J&J, but leaves you feeling sad. John Carmack has given up so much of his life to make the games we play. If *Doom3* is the last game he programs, God bless him. He has done more for computer gaming than any single person, and his engines are always awesome. But after reading about his life and long hours in front of a computer screen, I can't help but feel a little guilty when I pop open a beer and fire up *Quake*.

—KEN LANG

EDITOR-IN-CHIEF JON PHILLIPS REPLIES: Fair enough, but if I could make enough money to get into the kind of Ferrari breeding that Carmack enjoys, I might work insane prison-camp hours as well. But, of course, I'm not a programming genius. What Carmack really deserves credit for is accomplishing so much visual splendor in the face of so many development constraints. The 3D developers who work on Hollywood films create static content that just has to run once on a closed platform, but Carmack has to create interactive content that can run on myriad hardware combinations.

IT'S NOT WORTH IT, LAD! IT'S NOT WORTH FIGHTIN' FOR. WE'RE BIG ENOUGH TO TAKE A FEW INSULTS—DRINK YOUR DRINK

I know everybody uses it, but in the future could you please refrain from using the term "geek" to describe people who are knowledgeable about computers? If you pick up a Webster's dictionary, you will discover that a geek is the person at a sideshow carnival who bites the heads off of live chickens. I know it is a commonly misused word, but do you bite the heads off of live chickens to entertain people?

—BRAD NICHOLS

EDITOR-IN-CHIEF JON PHILLIPS REPLIES: Language is a living organism, and good dictionaries keep pace with the times. As you stated yourself, everybody uses the term (and we think at this point, the word's negative connotations have been stripped clean). *Maximum PC* is a populist magazine, so sorry, Brad, our usage stands!

WE'RE NOT WORTHY

On page 43 of your June issue, you erroneously accused Lieutenant Uhura of knowing that tribbles would be trouble right from the git-go. ("She just selfishly decided not to tell anyone.") No. Uhura had no idea that the little furballs would breed like lawyers in an ambulance factory. It was Spock and McCoy who first became aware of the reproductive proclivities of tribbleus maximus maximus, and they should bear the blame for not realizing soon enough the inherent dangers of the situation. And of course, Cyrano Jones himself certainly knew what he was unleashing on Space Station K-7. Honestly, guys—if you're going to be geeks, at least get your facts right.

—DAVID "I WAS THERE" GERROLD

> ***"YOU ERRONEOUSLY ACCUSED LIEUTENANT UHURA OF KNOWING THAT TRIBBLES WOULD BE TROUBLE RIGHT FROM THE GIT-GO."***

EDITOR-IN-CHIEF JON PHILLIPS REPLIES: Less *Trek*-oriented readers might be interested to know that David Gerrold really *was* there. That's right, among its readership, *Maximum PC* includes the guy who actually wrote "The Trouble With Tribbles" (my favorite *Star Trek* episode ever) and numerous other science-fiction masterworks! Thanks go to David for contributing to a pivotal piece of television history, and for helping us get just the right dialogue wording for the headline to Brad Nichols' geek letter. To show our appreciation for David's contributions, we'll soon be fulfilling his request for an article on quieting loud PCs. ■

CUT, COPY, PASTE

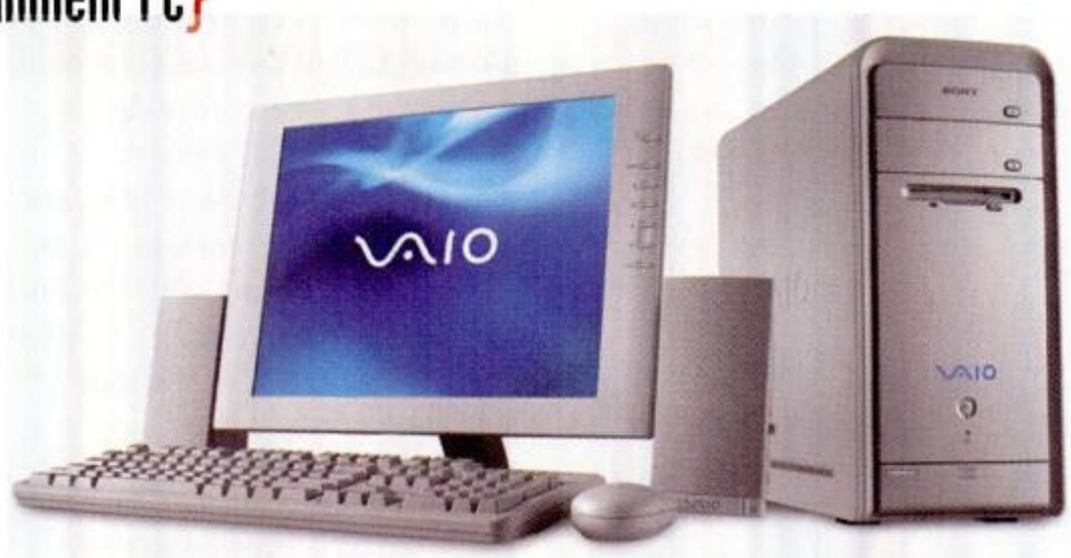
In the July issue, we should have referred to Doug Donakowski's Patriotic PC as a replica of a fighter *plane*, not a jet.

LETTERS POLICY: *MAXIMUM PC* invites your thoughts and comments. Send them to **input@maximumpc.com**. Please include your full name, town, and telephone number, and limit your letter to 300 words. Letters may be edited for space and clarity. Due to the vast amount of e-mail we receive, we cannot personally respond to each letter.

Copyrighted material

SONY

{RS Series Desktop Entertainment PC}



Display not included.

Stylish Multimedia.

Starting at $599.99

- *Intel® Celeron® processor at 2 GHz[1]*
- *Microsoft® Windows® XP Home Edition*
- *256 MB RAM*
- *60 GB HDD[2]*
- *CD-RW Drive*
- *Sony exclusive digital editing software package*
- *1-Year Limited Warranty[4]*

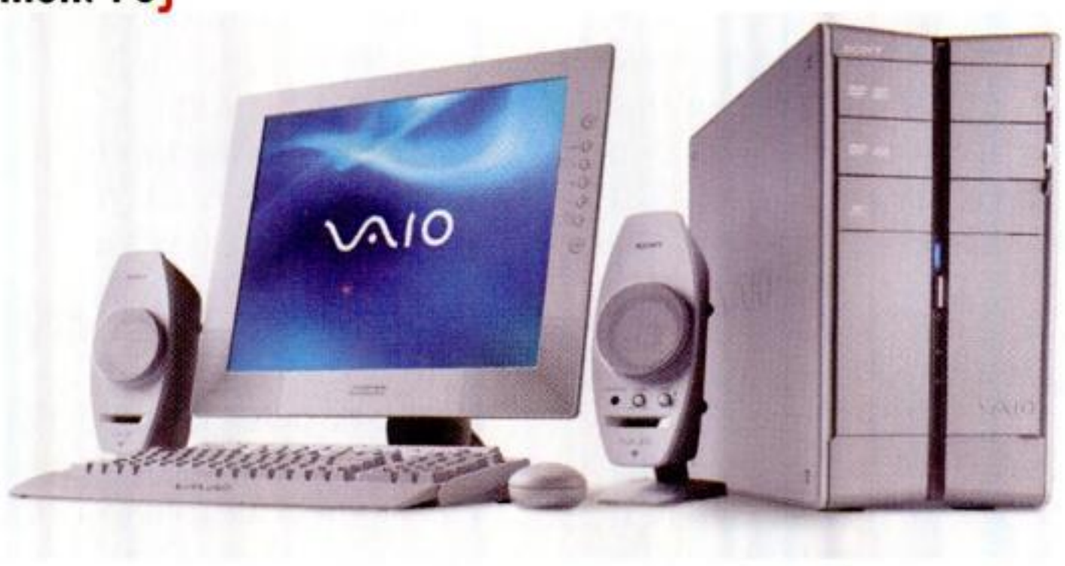
One-Click DVD Burning.

Nicely Equipped $879.99

- *Intel® Pentium® 4 processor 2.40 GHz[1]*
- *Microsoft® Windows® XP Home Edition*
- *256 MB RAM*
- *60 GB HDD[2]*
- *DVD-RW Drive[3]*
- *CD-ROM Drive*
- *Click to DVD™ software*
- *Sony exclusive digital editing software package*
- *1-Year Limited Warranty[4]*

Call to customize a RS series PC just for you.

{RZ Series Desktop Entertainment PC}



Display not included.

Burn DVDs. Be Creative.

Starting at $1,196.99

- *Intel® Pentium® 4 processor with HT Technology 2.40 GHz[1]*
- *Microsoft® Windows® XP Home Edition*
- *512 MB RAM*
- *80 GB HDD[2]*
- *DVD+/-RW Dual Format Drive[3]*
- *Click to DVD™ software*
- *Sony exclusive digital editing software package*
- *1-Year Limited Warranty[4]*

Record TV. Create DVDs From Home Videos.

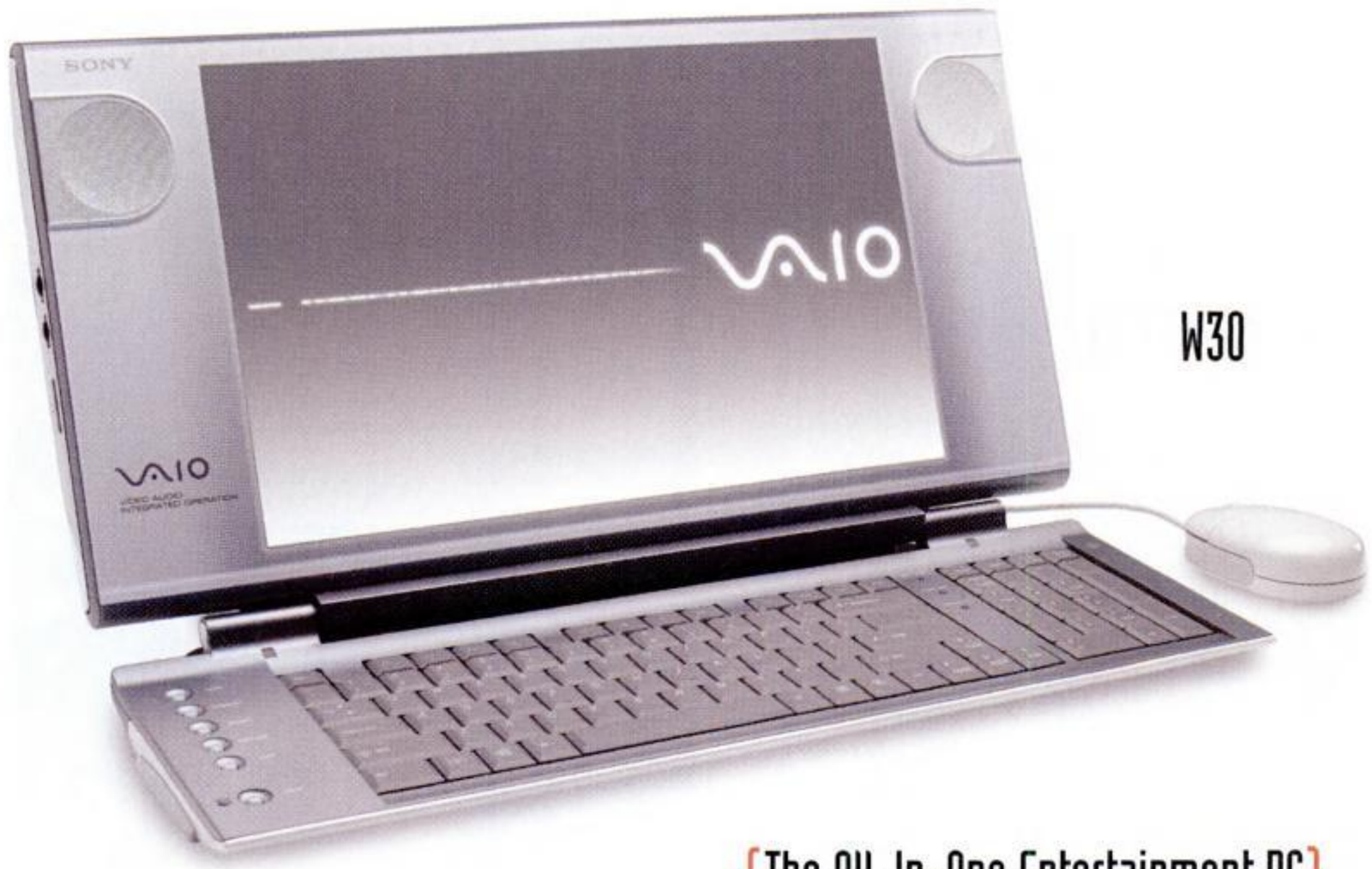
Nicely Equipped $1,396.99

- *Intel® Pentium® 4 processor with HT Technology 2.40 GHz[1]*
- *Microsoft® Windows® XP Home Edition*
- *Giga Pocket® Personal Video Recorder*
- *512 MB RAM*
- *80 GB HDD[2]*
- *DVD+/-RW Dual Format Drive[3]*
- *DVD-ROM Drive[3]*
- *Click to DVD™ software*
- *Sony exclusive digital editing software package*
- *1-Year Limited Warranty[4]*

Call to customize a RZ series PC just for you.

Copyrighted material

The Entertainment PCs. From Sony.



W30

{The All-In-One Entertainment PC}

Unique space-saving design. Wide-view 15.3" display. Built-in speakers. Watch DVDs. Burn CDs. Elegance blends with performance. Just $1,599.99

Sony recommends Microsoft® Windows® XP

Call Sony for your customized entertainment PC.

Sony desktop PCs with Intel® processors are designed to fulfill all of your entertainment passions. With all the features you crave. And nothing you don't. From the sleek W series to the ultra-functional RZ and RS series. Whatever you're into—DVD burning, downloading music, even recording TV content—Sony can help you do it all. And our trained specialists will help you create the entertainment PC that's just right for you and even help with financing. So call us today.

CALL SONY TODAY. 1-866-367-SONY

www.sonystyle.com

FREE SHIPPING AND FREE PRINTER

Get free shipping and a free EPSON stylus printer[5] [after mail-in rebate] when you buy an eligible PC direct from Sony.

©2003 Sony Electronics Inc. Reproduction in whole or in part without written permission is prohibited. All rights reserved. Sony, VAIO, Giga Pocket and Click to DVD are trademarks of Sony. Intel, the Intel Inside logo, Pentium and Celeron are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. Microsoft and Windows are trademarks of Microsoft Corporation. All other trademarks are trademarks of their respective owners. Features, prices, specifications, availability and promotions are valid only in the U.S. and are subject to change without notice. Prices and promotions do not include applicable sales tax or shipping and handling. Retailer price may vary. Sony is not responsible for typographical or other errors in this ad. [1]GHz denotes microprocessor internal clock speed; other factors may affect application performance. [2]GB means one billion bytes when referring to hard drive capacity. Five GB of hard disk space is reserved as a recovery partition. Accessible capacity may vary. [3]DVD compatibility is not universal. [4]From date of purchase with registration. Certain restrictions apply. [5]Printer model may vary. Offer expires 12/31/03. Screen images simulated.

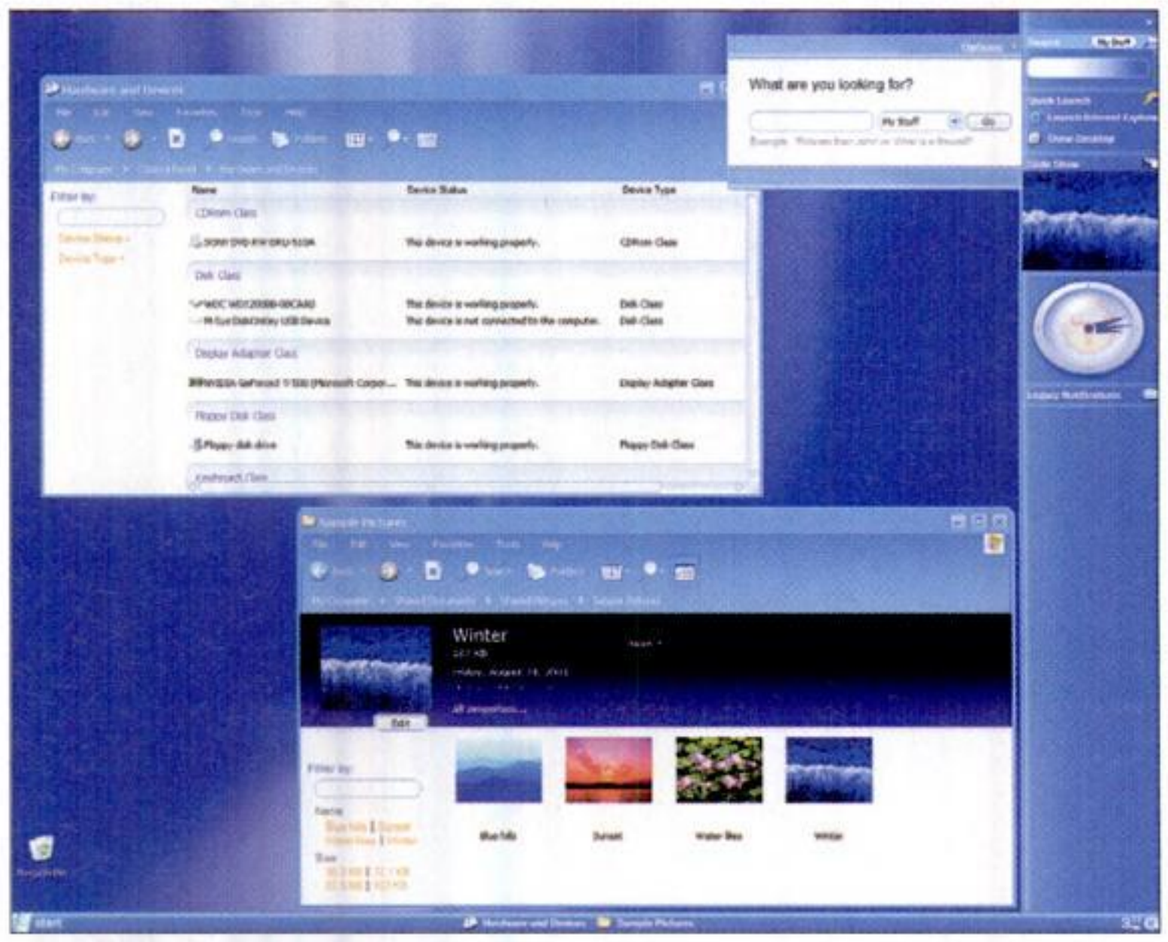
Copyrighted material

Quick Start

The beginning of the magazine, where articles are small

A Peek at Windows Longhorn

What we know (and what we don't) about Microsoft's next-gen 3D operating system



These screenshots from a very early alpha build of Window's Longhorn don't reflect what the new OS will look like, but do give us some hints about Microsoft's new direction.

Microsoft is keeping mostly mum about the next iteration of Windows—code-named Longhorn—so naturally, rumors are starting to fly. But recent alpha demos at WinHEC (Windows Hardware Engineering Conference) and other industry look-sees have made it a little easier to tell what Longhorn likely is and is not, and when it will hit the market.

If you've heard that NTFS is dead, you heard wrong. But much like DOS hid behind Win95, NTFS will be hiding behind a database approach to local file storage. Windows Future Storage (WFS, or WinFS) uses some of Microsoft's SQL Server technology to improve file searching and access times—a direction that Forrester Research analyst Rob Enderle says "presupposes that we're moving into terabyte-levels of desktop file storage."

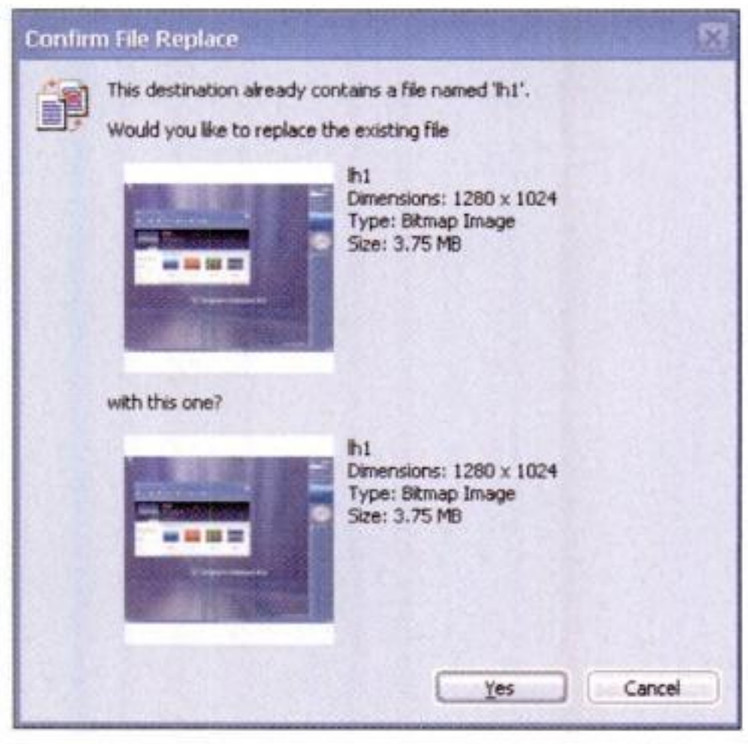
The desktop is getting a *major* overhaul. Rather than using a fundamentally 2D plane, Windows is going DirectX through and through, with each window being an independently rendered surface that can be smoothly scaled and manipulated at will. Microsoft has already demonstrated display hacks such as windows that flutter in a pixellated breeze. Expect huge animated features (making Mac OS X look understated), but don't expect anything you hear about at this stage of development to necessarily make it into the beta cycle.

Microsoft says it is committed to having the first stable implementation of its OS-level digital rights management and security system, NGSCB (Next Generation Secure Computing Base) ready next year, but hasn't committed to building the system into Longhorn. For NGSCB to work, it needs a "trustworthy" chip-level component to do the heavy lifting, expected at this point to come courtesy of Intel's LaGrange hardware platform.

In theory, the NGSCB architecture would make virus attacks much harder to program (because unauthorized code would not have access to delete or alter your files, send e-mail, and so forth) and close the doors to trojan horse code such as keystroke loggers. The data between the keyboard and motherboard would be encrypted, and only the active window would have the ability to decrypt it, cutting even a low-level OS hack out of the picture. Of course, NGSCB will be fully loaded with digital rights management capabilities as well.

The Longhorn/LaGrange pairing is a significant step for the ostensibly hardware-agnostic Microsoft. "It will be the first [Windows] product specifically designed to work with a hardware product," says analyst Enderle. This tight alignment means that Microsoft can ship bootable images of the new OS to vastly improve install times, and provide just one install image to OEMs. But questions about the non-Intel portion of the market remain unanswered. Microsoft has, in fact, spent so much time hyping the benefits of the new hardware architecture that it hasn't taken much time to answer questions about existing hardware. "It's not clear that you can take Longhorn and put it on a pre-LaGrange platform," says Enderle.

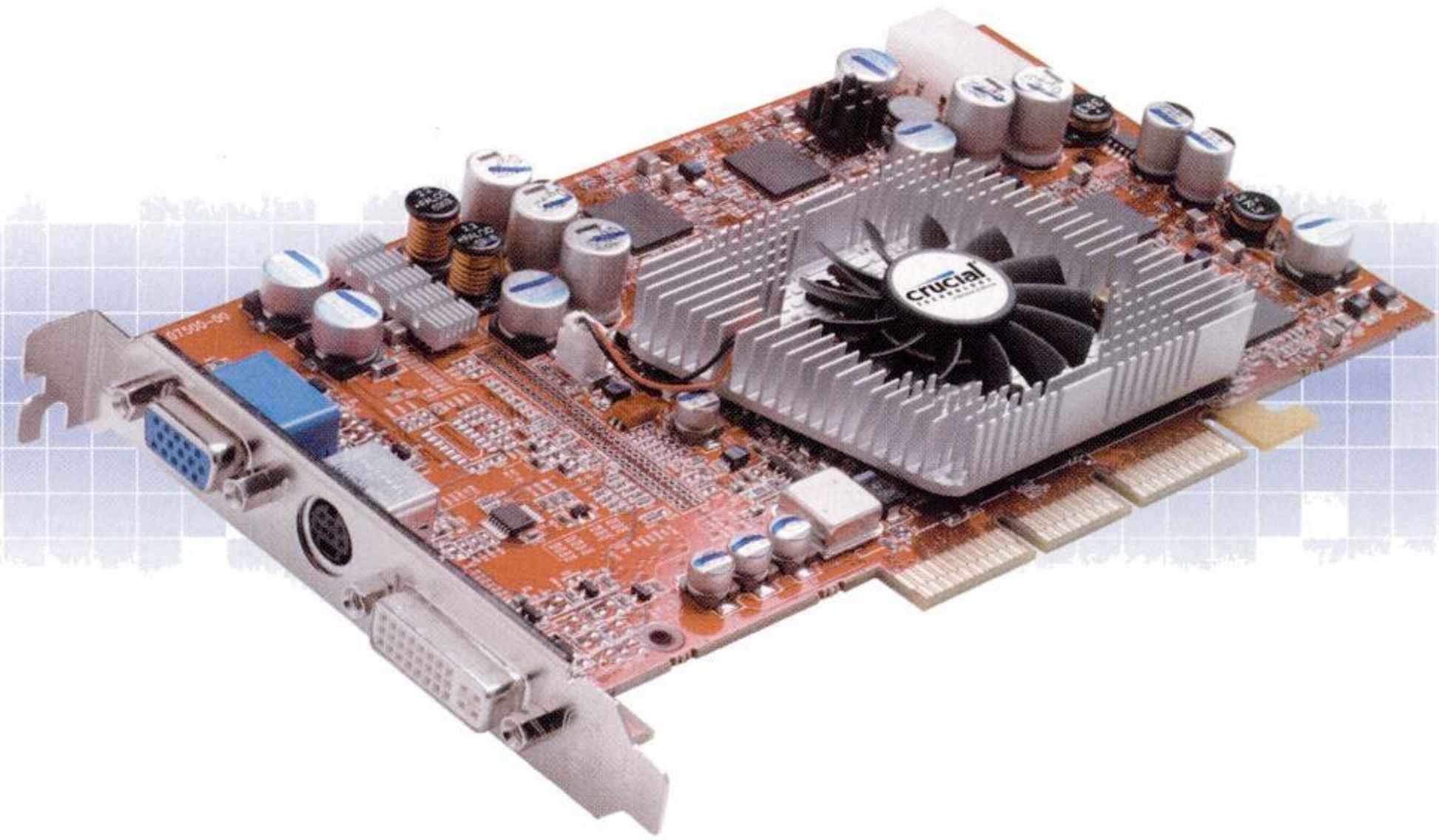
You'll probably be ready for an upgrade by that time, anyway. Industry watchers don't expect a beta until late 2004 at the earliest. Gartner Research says Longhorn won't be ready for release until the second half of 2005 and thinks it's fairly likely we won't see another major client OS for another five years after that. We imagine you will have maxed out that terabyte WFS partition by then.



Small innovations—like displaying thumbnails of files with identical names before overwriting—bode well for the next iteration of Windows.

Copyrighted material

Performance. It's Crucial.



What's Crucial to you? Superior image quality at lightning-fast speeds. Excellent frame rates at high resolutions. Sharp details, realistic textures, and complex 3D in real time. The feature-packed Crucial® Radeon™ 9800 Pro video card, with the only cinematic, second-generation video processing unit in the industry, delivers life-like images at speeds unachievable in the past. Experience old entertainment in new ways, and be ready for leading-edge applications yet to come! State-of-the-art performance. It's Crucial.

Features and specs:

- 128MB high performance quad-channel DDR memory
- 380MHz core frequency/2.8ns memory
- Full hardware support for DirectX® 9
- TRUFORM™ technology
- SMOOTHVISION™
- Anisotropic Filtering
- Video Immersion™
- Free tech support
- Limited lifetime warranty

Crucial® Radeon™ 9800 Pro Video Card

$399.99

FREE SHIPPING*

PC Makers' CHOICE — Shoppers' Computer Shopper 2001 Choice — Shoppers' Computer Shopper 2002 Choice — Circle of Excellence BizRate.com

Order online:

http://promo.crucial.com

or call toll-free 1-888-363-5154

Key code: 1max

crucial® TECHNOLOGY *A Division of Micron*

The Memory Experts℠

*See Web site for details.

The price listed was valid on 6/12/03 when we sent this ad to the publisher; however, prices may have dramatically increased or decreased since then.

© 2003 Micron Technology, Inc. All rights reserved. Crucial, Crucial Technology, the Crucial Technology logo, and The Memory Experts are trademarks/service marks of Micron Technology, Inc. in the U.S. and outside of the U.S. Radeon™ is a trademark of ATI, Inc. and is used under license by Micron Technology, Inc. DirectX™ is a registered trademark of Microsoft Corporation. OpenGL™ is a registered trademark of Silicon Graphics, Inc. All other trademarks are the property of their respective owners. Phone 208-363-5500. Fax 208-363-5501. E-mail crucial.sales@micron.com. Crucial Technology is not responsible for omissions or errors in typography or photography.

Copyrighted material

FUN-SIZE NEWS

Intel: Over One Billion Served

Marking its 25th anniversary serving tasty silicon to customers with ever-increasing appetites, Intel announced that it has shipped more than one billion x86 CPUs. Beaming like a spelling-bee champ, the chip manufacturer added that the next billion x86 CPUs would arrive much faster than the first—possibly as soon as 2007.

For your personal reference, one billion inches would wrap around the earth twice, a stack of one billion pennies would reach 1000 miles high, and it would take 93 years to count to one billion, if you talked at a reasonable clip and didn't eat, sleep, or do the nasty.

Mob Rule in Simville

As if general ennui weren't enough, another plague has beset the *Sims Online*—the mob. The *San Jose Mercury News* reported that, in the absence of any government or internal policing, a group called the Sims Shadow Government has taken over to allegedly address the anarchic behavior of some players. Sims Creator Will Wright admitted that Maxis is powerless to stop this development. Predictably, the situation is getting ugly, as shadow government representatives meet outside the game to plot revenge against wrongdoers.

Video Games Sharpen the Senses

We knew it. You knew it. But only now are researchers at the University of Rochester in New York beginning to realize that gamers demonstrate enhanced visual skills compared with non-gamers, including faster object recognition and greater attention over a wider visual field. The abstract, first reported in *Nature*, showed that even non-videogamers demonstrated improved visual skills after just 10 hours playing *Medal of Honor*. Ha!

In-Flight Email on United

United Airlines announced that all of its domestic flights will be equipped with two-way e-mail service by the end of the year.

UNITED

For $15.98 per flight plus 10 cents per kilobyte for every data packet greater than 2KB (ouch), you'll be able to plug your laptop into the Airfone handset and let everyone back home know what a wonderful time you're having in coach.

Wireless 802.11g Spec is Finalized

But does it support 54Mbps?

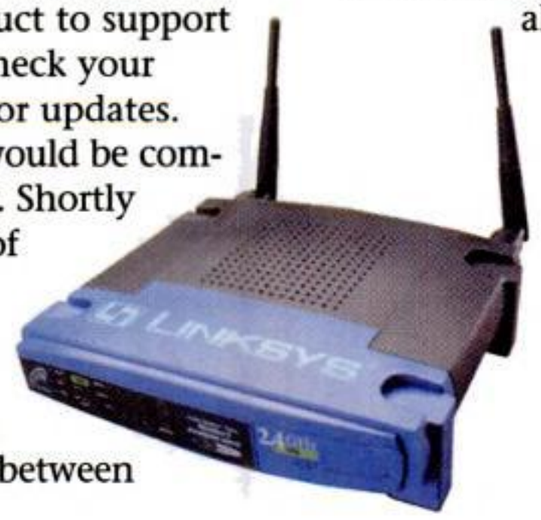
Wireless 802.11g networking products have been circulating for a while now, but none of these products has been based on the final standard. That's because up until now there hasn't been a final standard. The standards-creating body IEEE (Institute of Electrical and Electronics Engineers) completed the final draft (isn't that an oxymoron?) in June. The draft is now available to manufacturers for implementation.

If you've bought an 802.11g product based on an early implementation of the standard, chances are you'll be able to "flash" upgrade the product to support the final specification. Check your manufacturer's web site for updates.

Of course, no rollout would be complete without controversy. Shortly after the announcement of the final draft, *ComputerWorld* reported that the "true throughput" for the standard had plunged from 54Mbps to between 10Mbps and 20Mbps. A source for *ComputerWorld* explained that protection mechanisms built into the standard to guarantee compatibility with older 802.11b devices limits the throughput drastically.

But MacCentral.com reported that Mike Bell, vice-president of software at Apple, said that the discrepancy isn't as bad as it sounds, pointing out that 802.11b is spec'd to run at 11Mbps, but users rarely see anything above 5.5Mbps in actual use. Bell told MacCentral that the actual data rate for 802.11g has always been around 20Mbps.

So there.



What you see might not be what you get: There's no question that the 802.11g protocol built into wireless devices like Linksys' WAP54G ($130, www.linksys.com) is faster than 802.11b, but 54Mbps? Unlikely.

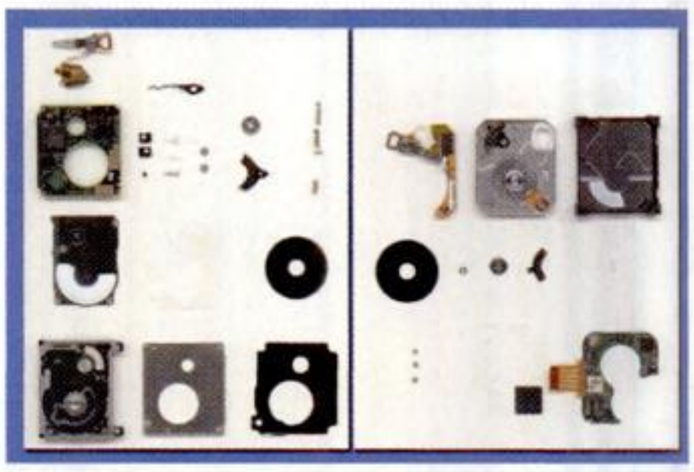
The Cornice Storage Element

It's a little drive with a big future

If you're trying to decide between a tiny solid-state MP3 player with limited storage and a bulkier hard-drive-based player with plenty of room, you might want to hold off on that decision for a few months. Cornice Inc. is trundling out a miniature hard drive designed specifically for portable digital devices, beginning with a 1-inch 1.5GB drive, with higher capacities planned for the near future.

Unlike Hitachi's MicroDrive, the Cornice Storage Element isn't just a miniature version of a typical hard drive. Cornice created a completely new drive design that dispenses with anything unnecessary for an embedded storage device. So while the Cornice Storage Element can't be transferred among different devices like the MicroDrive can, it uses just one-third of the components. And fewer components means less cost to the manufacturer, and that results in lower prices on the shelves.

The Cornice Storage Element is the object that doesn't have a bite taken out of it.



On the left are the innards of Hitachi's MicroDrive; on the right, the Cornice Storage Element's components.

The Cornice Storage Element has already picked up some fans. RCA, iRiver, and SonicBlue are developing MP3 players based on the Element, and Samsung has a digital camcorder in the works that's about the size of a pack of cigarettes, if you can remember what that looks like.

Copyrighted material

MPEG-4: Your 6-Point Cheat Sheet

Think "MP3 for video"

The MPEG-1 compression standard made it possible to put a full-length movie on one or two CDs, even if the results often looked as if cottage cheese was smeared all over the lens. The subsequent MPEG-2 standard raised the visual-quality bar considerably—it's the technology used to squeeze high-quality video onto a single- or dual-layer DVD. MPEG Layer 3 audio is what creates the MP3s we've all come to know and love. But if MPEG-4 sounds new to you, you might be surprised to learn that you may have already experienced its magic.

Ever watched a movie in the DivX or Xvid format? Then you've seen what MPEG-4 is capable of. MPEG-4 video offers much higher compression rates than MPEG-2, with better visual quality. Compression rates are scalable to the extent that, for the first time, near-DVD-quality streaming video is no longer a pipe dream. Here's what you need to know about this next-gen encoding standard.

WHAT IS MPEG-4?

MPEG-4 is a compression technology designed for multimedia, just like Zip compression is a technology designed for digital data.

HOW CAN I PLAY MPEG-4 VIDEOS?

All you need to play MPEG-4 video is a software player, such as Windows Media Player, and the proper codec (coder/decoder). The DivX codec can be downloaded at **www.divx.com**. The latest build of the Xvid codec can be found at **www.divx-digest.com**. The executables will install themselves.

WHAT'S THE DIFFERENCE BETWEEN MPEG-4 AND DIVX?

DivX, and its license-free sibling Xvid, are both based on the MPEG-4 compression standard. So a player that can play MPEG-4 videos can play these two formats.

WHAT'S THE DIFFERENCE BETWEEN XVID AND DIVX?

The DivX codec began as an open-source codec, but is now owned by DivXNetworks, Inc. and isn't free for commercial use. Xvid is an open-source sibling that is free, although technically still in development.

Lite-On's first consumer electronics device, the LVD-2001, is a progressive-scan DVD player, and will play MPEG-4 (including DivX and Xvid) movies right out of the box.

WILL MY SET-TOP DVD PLAYER PLAY MPEG-4 DISCS?

Probably not. We know of only two DVD players that support MPEG-4 playback. Denmark-based Kiss Technology's DR-450 DVD player (**www.kiss-technology.com**) was the first out of the stables to support MPEG-4, but it's difficult to come by in the US. Not to worry—optical drive manufacturer Lite-On has just released the LVD-2001 ($200, **www.liteonit.com**), a progressive scan DVD player that also supports MPEG-4.

WHY DO MPEG-4 FILES HAVE THE AVI EXTENSION? ISN'T THAT MICROSOFT'S FORMAT?

AVI (audio video interleave) is a media container format, not a compression standard. So MPEG-4 compressed files may still have the AVI extension.

▶▶ FAST FORWARD

BY TOM R. HALFHILL

Online Gaming Comes of Age

Just when you thought the Internet was solely intended for porn and spam, along comes a truly competitive app: online gaming. Not that online games are new; they've been around since the 1970s. But finally, all the pieces are falling into place to make it as popular as visionaries first predicted more than 20 years ago.

Those pieces are broadband Internet connections (wired and wireless), processors fast enough to render simulated 3D graphics in real-time, a strong infrastructure of game developers, and a customer base that starts with preschoolers and reaches upward to Baby Boomers pushing 60.

Broadband Internet access in the form of cable or DSL is now available to the vast majority of Americans who live in areas with more people than cattle. The adoption rate is slower than expected, though. One issue is cost. Typically, a home broadband connection costs more than the PC you plug it into. Do the math: $50 a month is $600 a year, and most people don't spend more than $1,800 every three years on a new computer. (Performance-obsessed *Maximum PC* readers are an exception.)

Surprisingly, however, cost is not the main obstacle to adopting broadband. Less than 32 percent of dial-up users surveyed by In-Stat/MDR blamed the monthly fees; more than 42 percent said they're sticking with their pokey analog modems because they simply don't need broadband. For casual web browsing and e-mail, they're right, but online gaming is a more demanding and compelling application. Cable TV didn't take off, either, until premium movie channels and innovative programming made it more attractive than free rabbit-ear TV.

Meanwhile, speedy CPUs and graphics coprocessors are producing real-time 3D animation that surpasses the best special effects available to Hollywood movie studios in past decades. The latest graphics card from nVidia has a heatsink from Venus and sucks so much electricity it needs a disk-drive power connector—the AGP slot can't supply enough juice. The graphics "coprocessor" has more transistors than a Pentium 4 processor.

Online gaming could solve the game industry's thorniest business problem: recouping the soaring cost of development. It can take years and millions of dollars to create a game that might fade away in months. By contrast, Parker Brothers still sells basically the same cardboard Monopoly game introduced in 1935. An electronic game might never achieve that classic status or longevity, but a business model based on monthly fees for online competition can amortize the steep development costs.

Incidentally, you can play Monopoly online. And that's what really makes online gaming a killer app—it solves the problem of finding someone to play with.

Tom Halfhill was formerly a senior editor for Byte *magazine and an analyst for* Microprocessor Report. *He is now a technical writer/analyst in Silicon Valley.*

Copyrighted material

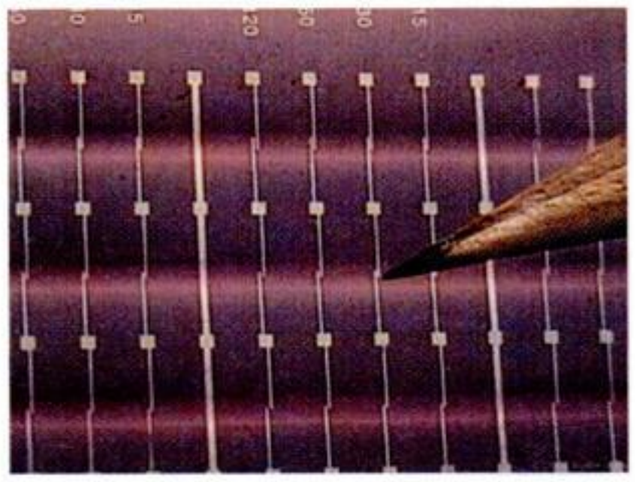
Thin Film Transistors Are on a Roll

Rolltronics rolls out a new manufacturing process

Producing transistors and semiconductors for electronics is a pain in the patootie. Plates have to be laid down, film has to be deposited, chemical etching has to take place, and everything has to be done in batches. You don't want to make too many or too few components, but sometimes there's no way of knowing how many to produce. What if you could simply print electronics on a roll, and cut sheets as you need them? Following the model established by newspapers and Saran Wrap, that's exactly what Rolltronics is doing.

The process is called roll-to-roll processing. A band of flexible plastic or metal (called a "web") is tensioned between rollers while metal is "evaporated" onto the surface at a rate that can go up to several meters per second. The web can be passed through several times, layering amorphous silicon over metal traces to create transistors, circuits, and semiconductors. Even paper-thin batteries are in development.

One of the first applications for the thin-film technology will be what Rolltronics calls "NanoMem" technology; the company expects a 64GB PC memory card using the roll-to-roll process to be available in 2004.



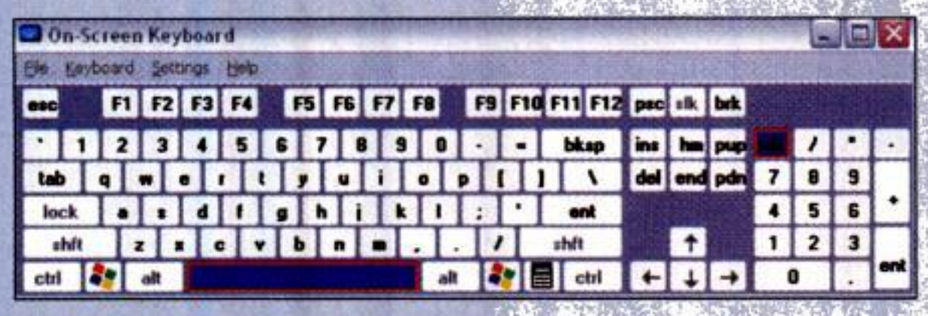
Tiny transistors have been printed onto thin film in Rolltronics' new continuous-roll manufacturing process.

The On-Screen Keyboard

A USB hub can get overloaded and suddenly turn its back on one or two devices. The batteries in your wireless keyboard will eventually run out. Sometimes your PC just "forgets" about its PS2 port. In each of these instances, chances are you'll be working on a very, very important document when it happens. *"What do I do now?"*

It's easy. In WinXP, click Start > All Programs > Accessories > Accessibility > On-Screen Keyboard. You'll find yourself confronted with a virtual keyboard that includes Windows and menu keys, as well as all the function keys and a numeric pad. Enter a filename for your document, save it, and reboot.

If you chose not to install the default Accessibility options in Windows XP, you can go back to panicking now.



It's not pretty, but the virtual keyboard built into WinXP can pull you out of a tight spot when your hardware keyboard poops out.

GAME THEORY

BY THOMAS L. McDONALD

Jumpin' Java

Sometimes you just get into the surfing zone and find yourself bouncing from web site to web site, exploring the majesty and strangeness that is the Internet. *Explorer* browser icons line up like wee soldiers along the bottom of the screen, attesting to your journey deep into the thickets of netdom. Meanwhile, *Pop-Up Stopper* clicks away, madly suppressing the Internet economy. Few of these stops snag my mouse for longer than it takes the quadruple beeps to indicate that another Tripod site is attempting to assault me with popups. Sometimes, however, the spiderwebs are fresh and sticky, and a site traps you for longer than you would've though possible. Orisinal.com is a case in point.

The work of web designer Ferry Halim, Orisinal consists of nothing but browser games. While most Java-based games are disposable crap, a few (such as *Diamond Mine*) are among the most-played games in the world. *Diamond Mine* is on cell phones, for God's sake! These are the GameBoy games of the PC: small, easy-to-play time wasters and coffee-break passers, and they can be remarkably addictive.

Orisinal consists of 48 little gems, all bearing Halim's unique style. Each is a combination of gentle, sometimes whimsical art with a Japanese influence (think big eyes and cute animals) and classic platform gameplay. None of the games are particularly new or daring—they consist mostly of variations on early falling/shooting/jumping side-scrollers—but the style and execution raise them to a higher level. These are games created with an artist's eye and a gamer's heart.

***Hungry Spiders* shows a cake sitting atop a window sill and beset by dangling spiders. You need to squish the spiders to save the cake. In *Runaway Train*, you jump from roof to roof on an endless runaway train, ducking or jumping over flags before they fell you. In *Rainmaker* a little boy floats on a cloud, hitting it with a huge mallet to make it rain on passing birds, while *Arctic Blue* features a whale that shoots a boat into the air with its spout in order to avoid icebergs and collect falling balloons. One of the most clever games on the site is *What Comes Around*: a difficult and uniquely circular arcade game where a cute squirrel must drop perfectly-timed walnuts onto gophers before they can take him down.**

These are beautiful little games, and words can't really convey their strange appeal. They're at once familiar and original: old standbys with a new, fresh style. If you think you can't be hooked by Java games, a single stop at Orisinal.com will change your mind.

Tom McDonald has been covering games for countless magazines and newspapers for 11 years. He lives in the New Jersey Pine Barrens.

Copyrighted material

Indi DVD is a registered trademark of TDK Electronics Corporation. All other brands and products are trademarks of their respective holders.
Specifications subject to change without notice.

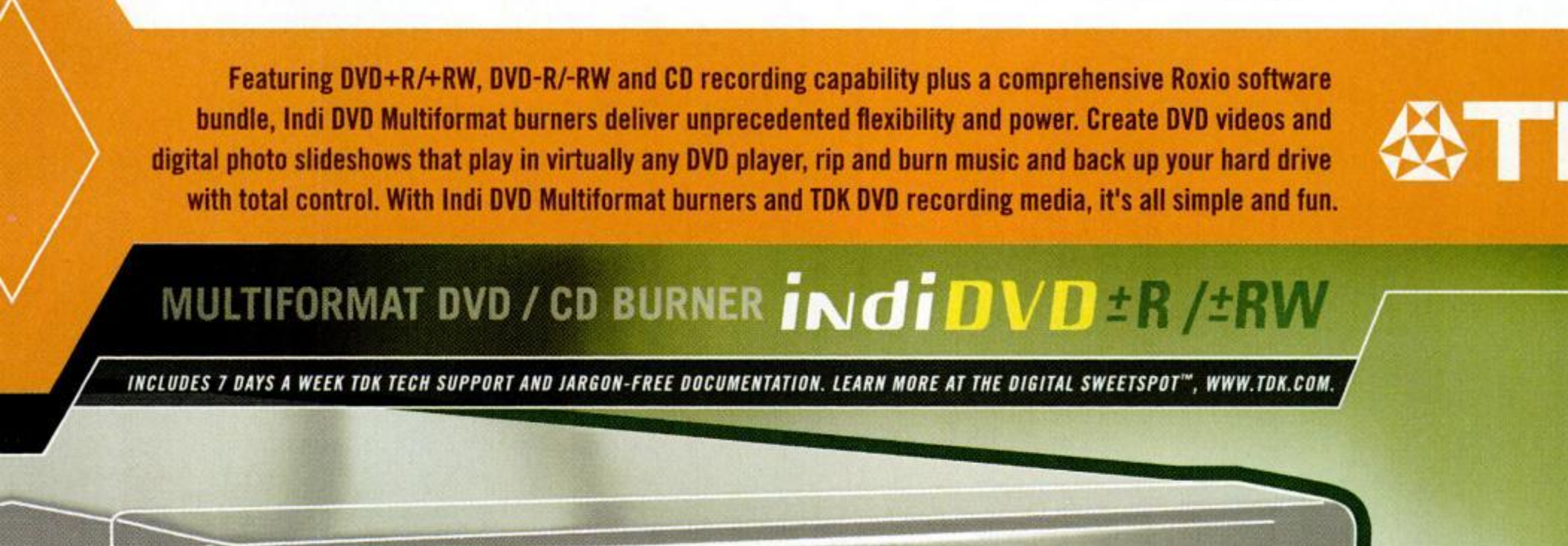
DOUBLE TAKE

Featuring DVD+R/+RW, DVD-R/-RW and CD recording capability plus a comprehensive Roxio software bundle, Indi DVD Multiformat burners deliver unprecedented flexibility and power. Create DVD videos and digital photo slideshows that play in virtually any DVD player, rip and burn music and back up your hard drive with total control. With Indi DVD Multiformat burners and TDK DVD recording media, it's all simple and fun.

TDK®

MULTIFORMAT DVD / CD BURNER iNdiDVD ±R /±RW

INCLUDES 7 DAYS A WEEK TDK TECH SUPPORT AND JARGON-FREE DOCUMENTATION. LEARN MORE AT THE DIGITAL SWEETSPOT™, WWW.TDK.COM.



Copyrighted material

NEW

DIMENSION™ XPS

Ultimate Gaming PC

- Intel® Pentium® 4 Processor at 2.80GHz with 800MHz Front Side Bus and HT Technology
- 512MB Dual Channel DDR SDRAM at 400MHz
- 120GB Ultra ATA/100 Hard Drive (7200 RPM)
- 19" (18.0" v.i.s., .24dp) M992 Monitor
- NEW 128MB DDR ATI® RADEON™ 9800 PRO Graphics Card with TV-Out and DVI
- 16x DVD-ROM Drive
- 48x CD-RW Drive with Roxio's Easy CD Creator® (2nd Bay)
- Sound Blaster® Audigy™ 2 Sound Card with DVD Audio
- Integrated Intel® PRO 10/100 Ethernet
- Microsoft® Windows® XP Home Edition
- WordPerfect® Productivity Pack with Quicken® New User Edition
- 6 Months of America Online® Membership Included*
- 1-Yr Limited Warranty* with XPS Telephone Support, 1-Yr At-Home Service*

$2259 as low as **$68**/mo.*
E-VALUE Code: 18120-D50725m

TAKE IT UP A LEVEL

Add more cutting-edge technology to your XPS system.

- Intel® Pentium® 4 Processor at 3GHz with 800MHz Front Side Bus and HT Technology
- 1GB Dual Channel DDR SDRAM at 400MHz
- NEW 240GB SATA RAID 0 (Data Striping)
- 4x DVD+RW/+R* Drive with CD-RW including Roxio's Easy CD Creator® and Sonic™ MyDVD™ (2nd Bay)
- Dell Gigabit Ethernet*
- 2-Yr Limited Warranty* with XPS Telephone Support, 2-Yr At-Home Service*

$3179 as low as **$96**/mo.*
E-VALUE Code: 18120-D50731m

AWARD DROOL GD

CUP OF DROOL AWARD
www.gamersdepot.com
Dimension XPS
April 28, 2003

INSPIRON™ 8500

Ultimate Mobile Gaming Machine

- Mobile Intel® Pentium® 4 Processor-M at 2.60GHz
- 15.4" Wide-Aspect UltraSharp™ UXGA TFT Display
- 512MB DDR PC2100 SDRAM
- 60GB Ultra ATA Hard Drive
- 24x CD-RW/DVD Combo Drive with Roxio's Easy CD Creator®
- 64MB DDR NVIDIA® GeForce4™ 4200 Go AGP 4x Graphics
- Front-Mounted Stereo Speakers for a Complete Multimedia Experience
- 72Whr Li-Ion Battery with ExpressCharge™ Technology (9 cell)
- Internal Fax Modem and NIC Included
- Microsoft® Windows® XP Professional, Microsoft® Works Suite 2003 with Money 2003 Standard
- 6 Months of America Online® Membership Included*
- 1-Yr Limited Warranty*, 1-Yr Mail-In Service

$2749 as low as **$83**/mo.*
E-VALUE Code: 18120-D80727m

COMPUTER GAMING WORLD
EDITORS' CHOICE
Inspiron 8500
May 2003

Software & Peripherals

Games. Joysticks. Dell can help you load up on all kinds of game gear!

- NEC/Mitsubishi LCD3000-BK 30" Flat Panel Display, $3999
- Logitech® Z680 5.1 Speaker System, $299
- Logitech® MX 700 Cordless Optical Mouse, $69
- Belkin® Nostromo n50 USB SpeedPad, $26
- Plantronics® DSP-500 Multimedia Headset, $76
- Logitech® MOMO Force Gaming Wheel, $129
- Unreal II®, The Awakening, $44
- MS® Sidewinder Force Feedback 2 USB Joystick, $89
- Logitech® Freedom 2.4 Cordless Joystick, $60 (shown below)

Click www.dell4me.com/maxpc

>>>Call 1-800-395-5383

***America Online: New members only. Must register for America Online dial-up service within 30 days of date of invoice. To avoid paying monthly membership fees, cancel during the 6-month promotional period. Even during promo period, telephone access charges on your phone bill (call your phone company for details) and surcharges for premium services and 800-number access may apply, including in AK.** For new, 18+ U.S. members with major credit card or checking account only. Limited time offer. America Online, AOL, the Triangle design and AOL Instant Messenger service are registered trademarks of America Online, Inc. **Pricing/Availability:** Prices, specifications, availability and terms of offers may change without notice. Taxes and shipping charges are extra, and vary. Valid for U.S. Dell Home Systems Co. new purchases only. Dell cannot be responsible for errors in typography or photography. **Gigabit Ethernet:** This term indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 GB/sec. For high speed transmission connection to a Gigabit Ethernet server and network infrastructure is required. **Software:** Software, documentation or packaging may differ from retail versions. **Limited Warranty:** You can get a copy of our limited

Copyrighted material

Dell Gaming PCs:

Machines that redefine the term

adrenaline rush.

Unreal II®: The Awakening
An intense epic adventure featuring superb graphics.

Unleash the full power of your games with Dell PCs. Dimension XPS Desktops. Inspiron Notebooks. Machines custom built just the way you want them. Machines that make serious gaming more affordable. Machines that fear no droid, no alien, and no undead. Machines built with the latest technology to blur the line between game and reality. Go online or call now and get a machine that brings to life an enemy. A machine that lets you hear what lurks in the darkness. A machine that's been pushed to the limits of testing-both inside and out-to perform in the real world, and the world that consumes your mind. Service and support is available 24/7/365. But the nightmares you get from the games are your own problem.

Intense Gaming. Easy as DELL™

Dell recommends Microsoft® Windows® XP Professional for Mobile Computing

warranties and guarantees by writing Dell USA LP, Attn: Warranties, One Dell Way, Round Rock, TX 78682. To purchase warranty only or for information on other service options please call 1-800-915-3355 or visit dell4me.com/service. **Service:** At-Home service provided via third-party contract with customer. Technician will be dispatched, if necessary, following phone-based troubleshooting. Availability varies. Other conditions apply. **DVD+ RW and DVD+RW/+R Drives:** Discs burned with this drive may not be compatible with some existing drives and players; using DVD+R media provides maximum compatibility. **PURCHASE PLAN: Dell Preferred Account:** Offered by CIT Bank to qualified U.S. residents with approved credit. Taxes and shipping charges are extra and vary. **Trademarks/Copyright Notices:** Intel, Intel Inside, Pentium and Celeron are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. Microsoft and Windows are registered trademarks of Microsoft Corporation. ©2003 Dell Computer Corporation. All rights reserved.

Copyrighted material

Head2Head

A showdown among natural PC competitors

THIS MONTH: Compact Digital Cameras

This month we bring you the lowdown on two tiny cameras that boast impressive specs and features. If you haven't looked at digital cameras lately, you'll find that they've come a long way. The once-professional-grade 4-megapixel resolution can now be had in a package that fits nicely in a shirt pocket.

And these oh-so-irresistible bad boys won't cost you a NASA budget, either.

Some will argue that film still beats digital when it comes to rendering subtle contrast differences, and that only film is capable of the image quality required by especially large prints. That may very well be true, but the image quality of 4-megapixel-class cameras is more than sufficient for the vast majority of our day-to-day photo needs. Besides, with digital cameras, you're spared expensive lab fees and the wait for "prints" to be ready.

And did we mention that our digicam contenders are small? Think what you will of these miniaturized wonders, but just remember the old saying: "The only useful camera is the one you're carrying."

—DWIGHT LOOI

CANON POWERSHOT S400 DIGITAL ELPH

Battery life: The S400 get its juice from a rechargeable 3.7v Li-Ion battery of 840 mAh capacity. Despite being physically larger than the battery in the Olympus camera, it has less storage capacity. To wit, the Powershot's battery life was somewhat worse than the Stylus 400's, but still capable of a useful two hours or so of continuous uptime. We experienced a 50 percent increase in battery life by simply powering down the LCD monitor. **Winner: Olympus**

Storage/connectivity: The S400 uses CompactFlash Type-I cards for storage, and comes bundled with a 32MB CF card. CF Type-I cards are available from a wide variety of vendors, and capacities of 1GB are easy to come by. Because they're so common, CF cards are relatively inexpensive compared with other digital-camera storage formats. A micro-jack offers video and sound output to TV. Both cameras rely on a mini-USB connector to provide PC connectivity at USB 1.1 speeds. **Winner: Canon**

MAXIMUM PC KICK ASS PRODUCT

Auto-focus: The S400 features a nine-zone auto-focus system, as well as an option to use the conventional single-zone arrangement typical of point-and-shoot cameras. Focus is achieved via passive contrast detection, and the camera has a focus-assist beam to permit focusing even in total darkness. Focusing takes about one second, which is slow compared with many 35mm and APS point-and-shoots, but typical of digicams. **Winner: Canon**

Features: The S400 is filled to the brim with features. We like the orientation sensor, which displays images upright on the LCD monitor regardless of how the picture was shot. The Canon is also capable of recording sounds as well as images. Shutter-speed range is a class-leading 15 seconds to 1/2000 second, with built-in noise-reduction processing during long exposures. Light metering can be set as evaluative, center weighted, or spot mode—high-end features that should appeal to prosumers. There is also a plethora of manual options, such as custom white-balance and manual ISO settings (50, 100, 200, and 400). Short of fully-manual exposure and focusing controls, the S400 has every feature we'd want. **Winner: Canon**

Ergonomics & usability: The S400 is small, slim, neat, and clad in satin-finished metal. Both cameras have menus and buttons that are logically laid out and ergonomically positioned. The Canon's arrangement is more complex, but this is hardly surprising given the camera's scads of features and user-configurable parameters. **Winner: Tie**

Lens/CCD: The S400 packs a 3x zoom lens equivalent to 36–108mm (7.4-22.2mm, f 1:2.8–4.9). Both cameras are equipped with a CCD of approximately 4.1 million photo detectors and 3.9 million effective pixels. The Canon lens/CCD combination is slightly faster, notably sharper, and capable of focusing to an amazing 5cm in macro mode. In fact, this is as sharp a zoom lens as we have seen in a digital camera this size. The Canon also produces virtually noise-free images at the ISO50 setting. **Winner: Canon**

MAXIMUM PC VERDICT

Powershot S400
CANON

SAY CHEESE!
Impressive image-quality, great performance, small size, best-in-class feature-set for prosumer types.

CHEESE WHIZ
Not much.

www.usa.canon.com
$500
10

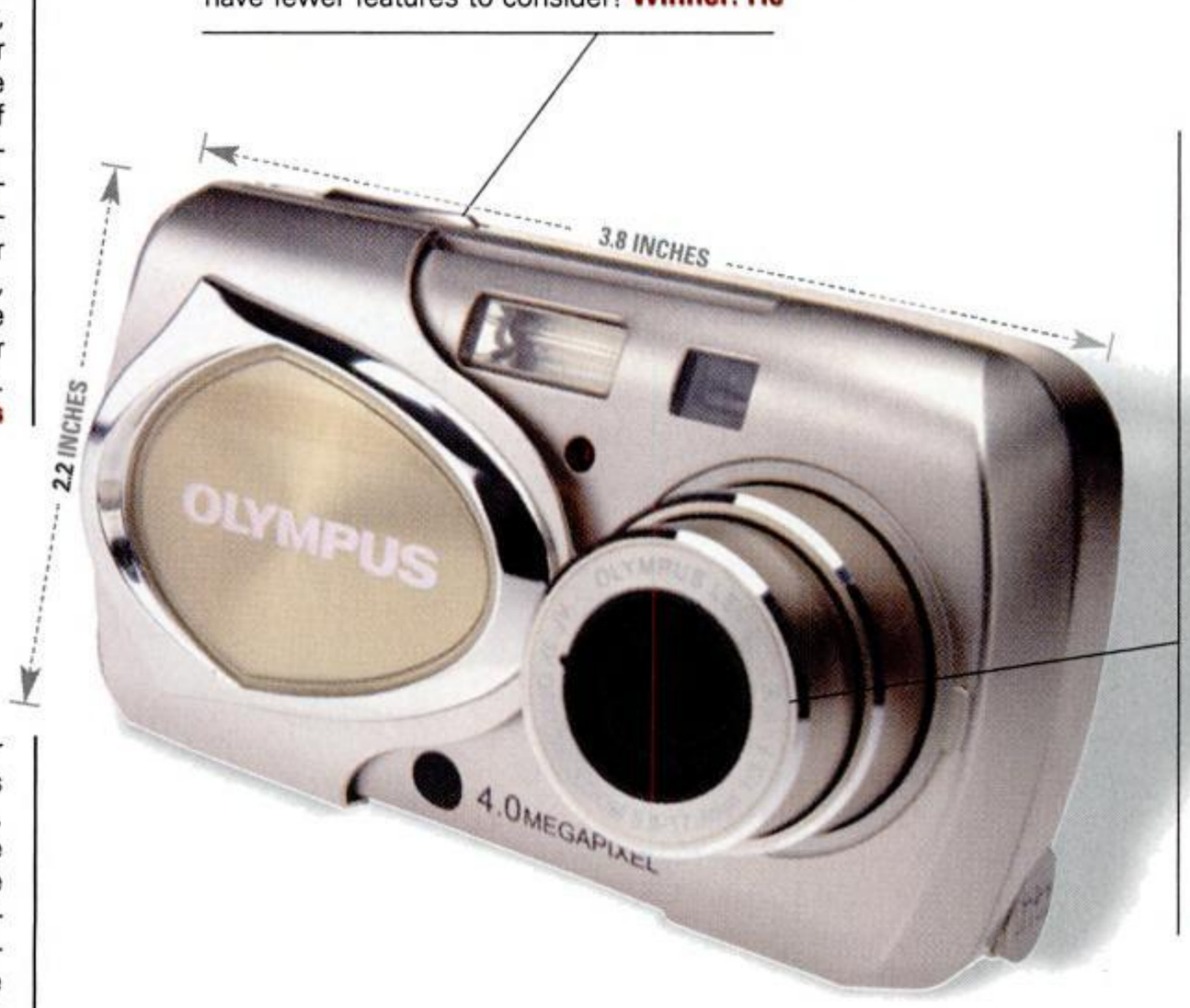
Copyrighted material

OLYMPUS STYLUS 400 DIGITAL

Battery life: The Stylus 400 is powered by a 3.7v Li-Ion battery of 1090 mAh capacity. Despite its 30 percent greater capacity, this battery is physically smaller than the one found in the Powershot S400. Battery life of the Stylus was somewhat better than the Canon (as expected), especially when the cameras were tested with their LCDs always-on. But of course, you'd be wise to turn off the power-hungry LCD when power conservation is a priority. **Winner: Olympus**

Storage/connectivity: For storage, the Stylus 400 uses the new XD picture cards, which just can't match the capacity of CompactFlash. The Stylus, in fact, ships with a particularly low-capacity XD card—just 16MB. You can purchase XD cards with capacities up to 256MB (whoopee), but they tend to be dearer and less commonly available than most other formats. A micro-jack offers video output to TV. Both cameras rely on a mini-USB connector to provide PC connectivity at USB 1.1 speeds. **Winner: Canon**

Ergonomics & Usability: The Stylus 400 is beautifully finished, and is a pleasure to touch and use. However, it's also slightly larger and somewhat thicker than the Powershot S400. Both cameras have menus and buttons that are logically laid out and ergonomically placed. The Olympus may be marginally easier to master, thanks to its smaller number of button assignments, and it does have a slightly simpler interface. But that's the luxury users get to enjoy when they have fewer features to consider! **Winner: Tie**



Features: This is where the Olympus camera falls short. It's bereft of sound recording, custom white-balance, and manual ISO setting. And, of course, the Stylus 400 doesn't have Canon's nifty orientation sensor. In addition, the shutter-speed range is significantly more limited than the S400's—just one-half second to 1/1000 second. To its credit, the Stylus 400 is weatherproof, so a raindrop or two won't hurt it. Both cameras have all the requisite flash modes for compact cameras (auto, on, off, redeye, and night scene). **Winner: Canon**

Auto-focus: The Stylus 400's focusing system references a single rectangular zone near the center of the frame. The Stylus 400 wasn't very good at focusing in really low light conditions, and there's no focus-assist beam to help out. Like the Powershot, focusing takes about one second, which is pokey. **Winner: Canon**

Lens/CCD: The Stylus 400 packs a 3x zoom lens equivalent to 35-105mm (5.8-17.4 mm, f 1:3.1-5.2). Like the Powershot, the Stylus is equipped with a CCD of approximately 4.1 million photo detectors and 3.9 million effective pixels. The Olympus lens/CCD combination is slightly slower, and produced a marginally softer image. Overall sharpness of the Stylus 400 is still very good, with little or no chromatic aberrations under most conditions. In macro mode, the lens focuses down to an impressive 10cm, but that's not nearly as close as the Canon. Noise level is also minimal, but slightly worse than the Powershot S400 (when the S400 is set to ISO50). The Stylus 400 does not permit manual ISO settings. Unfortunate—but dummy-proof, perhaps. CCD sensitivity is set automatically between ISO 80 and 320. **Winner: Canon**

MAXIMUMPC VERDICT

Stylus 400 Digital
OLYMPUS

SMILE!
Good ergonomics, excellent construction, good image-quality, good battery endurance.

YOU BLINKED
No ability to focus in the dark. Minimal features and user-control. Storage limitations.

www.olympusamerica.com
$500
8

THE UPSHOT

The Olympus Stylus 400 Digital lost most of the battles in this head-to-head, but that doesn't mean it's a bad camera—not by a long shot. The Olympus is well made, has a great user interface, and is capable of capturing excellent images. By any standard, it is an admirable example of what a compact digital camera can and should be. But, unfortunately, it's in the company of the astounding and feature-packed Powershot S400.

Both cameras are capable of producing breathtaking images, but considering their competitive pricing, the Canon S400 is definitely the better buy. It's *Maximum PC's* speed, without a doubt. That said, if we had to buy the best $500 digital camera for a novice who absolutely refused to climb a learning curve, the Olympus would be our pick.

Copyrighted material

WatchDog

Say hello to Baron, WatchDog of the Month.

Maximum PC takes a bite out of bad gear

THIS MONTH: The WatchDog goes after...

>ASUS > nVIDIA >Buslink >Arena Computers

nForce2 400MHz Support

DEAR DOG: I just found out that Asus will not support the new 400MHz FSB Barton, as its boards are unstable at those speeds. However, I've read all over the Internet that NF2 boards should support it! A call to Asus (including almost two hours on hold—*long distance*) revealed that 400MHz support is not offered with old revisions of the board, only on rev 2.0.

That seems kinda fishy to me. It's the same motherboard model, same chipset, just a different revision to fix whatever problems it had!

What's worse, the tech told me the policy is to replace defective boards with the same revision. Revs 1.04 and up will not work with 400MHz "Barton" Athlon XP. The only way I can get the new rev 2.0 board that is supposed to have fixed everything is to buy another one?

Keep in mind, I am not an early adopter, and the A7N8X Deluxe had been out a while when I bought mine. My vendor doesn't do replacements, and will just send it to Asus for repairs.

I never knew how bad Asus tech support and policies were until I really needed them. I've owned several Asus boards, and the A7N8X fiasco, long wait times, and being stuck with a flawed mobo (a flagship board, too!) now makes me wary of its products. I've heard better things about Abit and Epox.

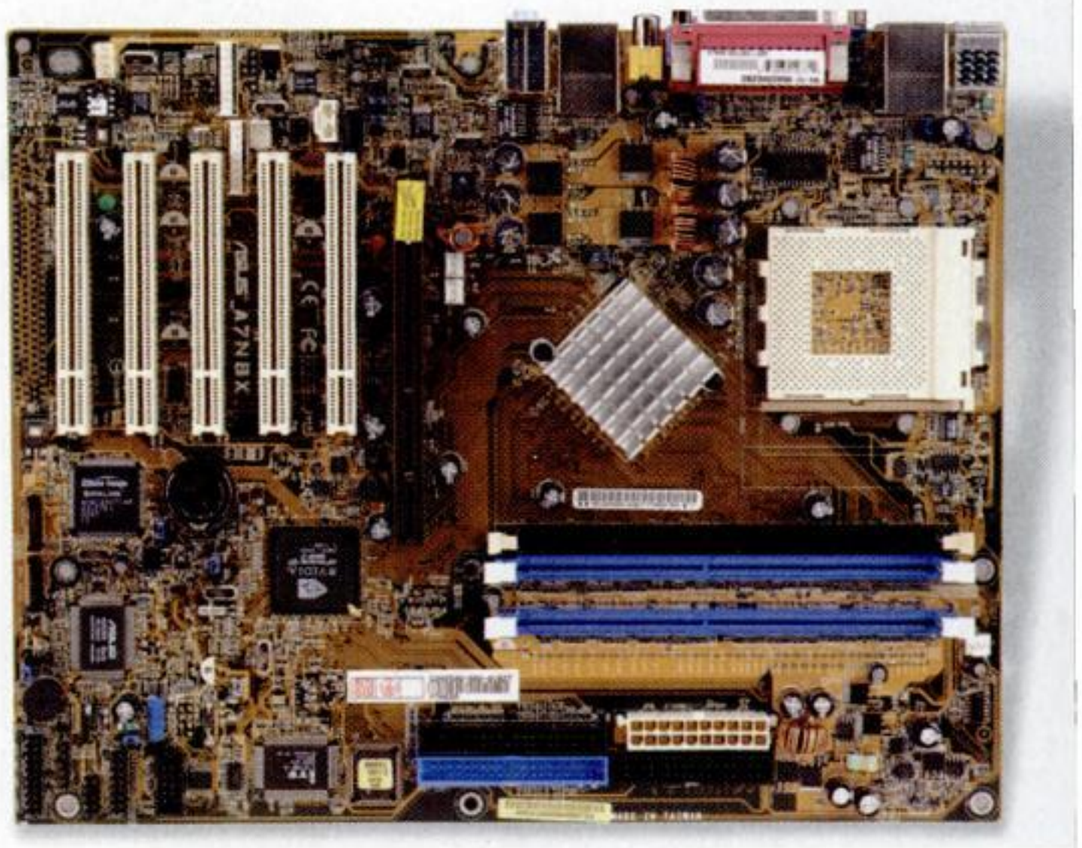
— NORMAN

THE DOG RESPONDS: Like Norman, the Dog was surprised to hear that some nForce2 motherboards wouldn't support 400MHz CPUs. After all, nVidia had touted 400MHz bus support when the nForce2 was first announced in fall 2002. The Dog spoke with nVidia officials who said the problem was of the "chicken or egg" variety. While the chipset is qualified to run at 400MHz, a board's design may or may not accommodate the spec. According to nVidia officials, some board vendors did not have actual 400MHz frontside CPUs to test with their motherboards. nVidia has since taken steps to clear up the confusion: The new nForce2 400 and Ultra 400 chipsets denote support for 400MHz bus CPUs. The company says it unfortunately can't control how board vendors design their products.

For its part, Asus never actually marketed the first nForce2 motherboards as offering 400MHz bus support, claiming 400MHz bus support only with the PCB revision 2.0 motherboards. So who's at fault here? It's hard to blame Asus since it didn't make any false claims. nVidia, on the other hand, evangelized 400MHz bus speed support as a feature of its chipset. It seems the company was more aggressive about pushing the feature than enforcing the support with board vendors. Of course, some responsibility also lies with motherboard reviewers and the tech news media for letting nVidia slide on the new feature without being a little more skeptical of the support.

This isn't a problem endemic to motherboard makers. We saw a similar situation arise with first-generation DVD+RW optical drives. Some vendors promised +R capability but reneged after it was discovered that a hardware, rather than firmware, update was necessary. The lesson the public should take to heart is that marketing claims can be deceptive. Try to read between the lines of product reviews. "Future upgrade support," for example, is a red-flag phrase that should always be considered critically.

The story has a happy ending, though: After hearing the complaints of *Maximum PC* readers, Asus sent its engineers back to the drawing board to add the missing 400MHz support. Indeed, boards with PCB revisions of 1.04 and higher now support 400MHz CPUs when used with the correct BIOS. (Please note that rev 2.0 boards use a different BIOS than 1.x boards.) Obviously, if you're shopping around, opt for the latest chipset and mobo revisions, but a doggy bone does go to Asus for listening to its customers and solving the problem for at least some A7N8X owners.



Rev 1.04 A7N8X Deluxe motherboards can now support 400MHz FSB CPUs, but many other nForce2 boards still cannot.

> ***"IT SEEMS THE COMPANY WAS MORE AGGRESSIVE ABOUT PUSHING THE FEATURE THAN ENFORCING THE SUPPORT WITH BOARD VENDORS."***

Is Arena Computers AWOL?

DEAR DOG: In May I paid $300 to Arena Computers in Texas (**www.arenacomputers.com**) for a custom Antec SX1080 AMG case. Arena Computers' web site is now under

Copyrighted material

"reconstruction" and no one responds to my e-mails. I tried calling, but all the numbers are disconnected. I filed a complaint through Paypal, and now I'm asking for your help.

— MIKE FRINK

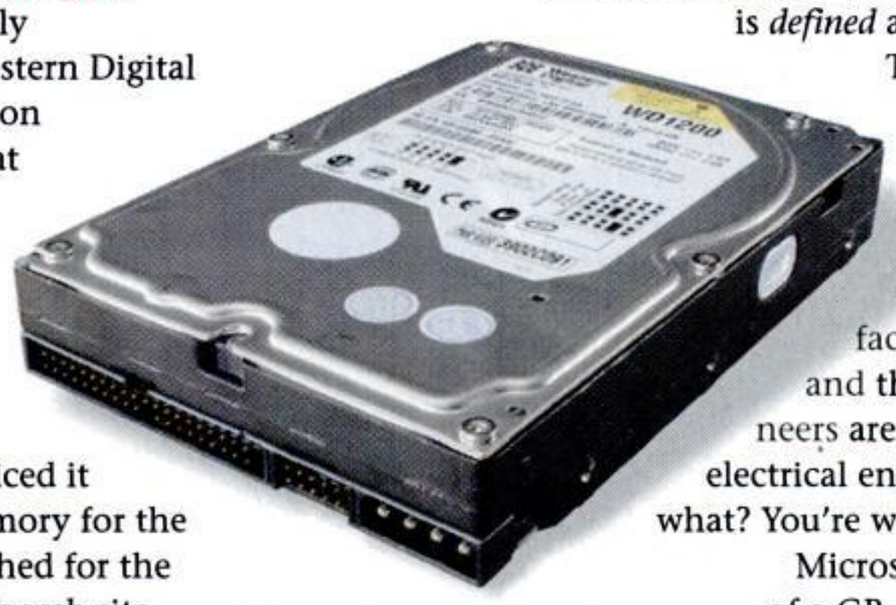
THE DOG RESPONDS: Bad news, Mike: It looks like Arena Computers has checked out for good. The Dog had little success contacting owners of Arena Computers, which dealt mostly in custom cases. A query of the Texas Franchise Tax Board revealed Shawn Stewart as the president of the company and Charles Turner as the vice president. The Dog located a phone number for a Shawn Stewart in Spring, Texas, but that number was disconnected.

Oddly, there were no early indications that Arena Computers was melting down. At Resellerratings.com, most customers reported positive experiences. The Houston branch of the BBB also didn't register any negative listings for the company. Owners of Arena Computers, where are you? Until Arena Computers' situation is cleared up, consider it in the Dog House. Woof.

Jumbo Buffer or Just Extra-Large?

DEAR DOG: I recently purchased four Western Digital WD1200JBs based on *Maximum PC's* great reviews. I'm the curious type and decided to take the PCB off the hard drive in order to look at the circuitry. I noticed it used Samsung memory for the 8MB cache. I searched for the chips on Samsung's web site to find some info about them (speed information mainly). To my surprise they show up as 4MB chips! Am I going nuts or is Western Digital trying to pull a fast one (or should I say a slow one)?

— GABRIEL FINNEY



The jumbo buffer in this hard drive is indeed 8MB.

THE DOG RESPONDS: The Dog didn't think Western Digital would substitute a 4MB part for an 8MB part, but the matter deserved investigating. Western Digital officials told the Dog: "Since the memory we use is either 1Meg x 16 = 2 MB, or 4Meg x 16 = 8 MB, and a Word (16 bits) is 2 Bytes, the reader may have confused the 4M as 4 MB, but it is really 4 MegaWords which = 8 MegaBytes."

In other words, rest assured that those popular jumbo-buffer drives indeed have 8MB caches.

Counterpoint: An EE's Take on Gigabyte

DEAR DOG: I disagree with your opinion on the definition of kilobytes, megabytes, and gigabytes published in the June 2003 issue of *Maximum PC*.

Although the ISU (or SI) does indeed define the prefixes "kilo," "mega-," and "giga-" to mean 10^3 power, 10^6 power, and 10^9 power, respectively, the computer industry never adopted this definition. It's true that it borrowed the "somewhat more familiar" scientific prefixes to create its new computer terms; however, the computer industry was created by engineers. And, as I'm sure you are well aware, scientists and computer engineers rarely speak the same language. Whereas the majority of the scientific universe speaks in decimal, the vast majority of the computer universe speaks in binary. Consequently, a system based on powers of 2, not 10, just seemed natural to computer engineers. Hence, a kilo in computer speak is *defined* as 1,024. A mega in this same language is *defined* as 1,048,576. Similarly, a giga is *defined* as 1,073,741,824.

These are established technical definitions. Your response makes it sound like the hard drive manufacturers are right and thousands of engineers are wrong. I'm an electrical engineer, and guess what? You're wrong.

Microsoft's definition of a GB or gigabyte is correct. Hard drive manufacturers purposely mislead the public by advertising their drives at a data storage capacity larger than they are really capable of holding. This wasn't a big deal when a drive held a few megabytes, but now that they're approaching the terabyte range, the deception means big money—more profit margins for the hard drive manufacturers. If you want more information, please check out **www.wikipedia.org/wiki/MB**.

Although your response to Jason is accurate from a certain point of view, some of the key pieces to the puzzle were missing, and therefore, I felt compelled to write and point them out.

— SCOTT LINGEN

Jennifer from Roswell, New Mexico, says a rebate check for a Buslink device bounced. Roswell? Conspiracy?

Bouncing Rebate Checks

DEAR DOG: We recently received a rebate check from Buslink that bounced—the account was closed. The company will not make good on the bounced check, which cost us money for a returned deposit.

I have copies of the check, stamped account closed, a letter from the bank, etc. I have faxed copies to the company several times, but I never hear back from them, and when I call about it, they ask me to fax the info again.

— JENNIFER SCHWARZ

THE DOG RESPONDS: The Dog spoke with an official at Buslink who said that Jennifer likely waited too long to cash the rebate check. When rebates are offered, accounts are created from which to disburse monies. After the rebate period has passed, say, 60 days from when the last rebate check is issued, the account is closed. Depositing a check after the period would result in a bounced check. Jennifer told the Dog, however, that she deposited the check as soon as she received it, and is sure it was deposited within the 60-day limit. Buslink admitted to the possibility of a glitch, and plans to reissue a check and address any reasonable bank fees. ■

> *"THE COMPANY WILL NOT MAKE GOOD ON THE BOUNCED CHECK, WHICH COST US MONEY FOR A RETURNED DEPOSIT."*

Got a bone to pick with a vendor? Been spiked by a fly-by-night operation? Sic The Dog on them by writing **watchdog@maximumpc.com**. The Dog promises to get to as many letters as possible, but only has four paws to work with.

Copyrighted Material

It's coming. Can you hang?

Does your PC have enough juice to run *Half-Life 2?* It's the upgrading question of the year, and only we have the answer—along with a juicy analysis of the game's stunning visual effects. Behold the majesty!

BY WILL SMITH

If you're like us, you've been waiting more than two years for a true programmable shader spectacle. A no-compromises triple-A title that's got it all: gameplay, suspense, and knock-you-on-your-ass visuals that validate the promise of programmable videocards.

Many of us thought the holy grail of programmable shader games would be *Doom3*—especially after a rough but breathtaking demo of the game was leaked on the Internet. But then Valve software announced that *Half-Life 2* would be released on September 30 this year, and attention shifted from Carmack's next tour de force. (*Doom3* doesn't have a release date, and we don't expect it in time for the holidays.) *Half-Life 2* is being designed to take advantage of every single transistor in your DirectX 9 videocard. This is the triple-A game we've been waiting for, and we fully expect this sequel to be every bit as revolutionary as the original.

It wasn't technology that made *Half-Life* special, it was the story, which was as engrossing and textured as Hollywood's finest sci-fi paranoia action flicks. And now we eagerly await *Half-Life 2.* When we first saw this game running at the E3 trade show in May, we were absolutely flabbergasted by the realistic scenes its custom-brewed Source engine could produce. Could it be that *Half-Life 2* would have amazing gameplay *and* incredible visuals? Well, we can't comment on the quality of the story, but we can tell you this is one must-have title for all PC hardware junkies—when it comes out, it will be the new real-world visual-quality benchmark.

But will you be able to run the game with all its programmable shader effects set to maximum? Let's be clear: There aren't any benchmark numbers in this article. Those numbers will come when Valve releases *Half-Life 2* later this year. But what we will show you are all the fancy-schmancy shader effects programmed into the game, and we'll also tell you whether they'll be enabled or disabled for your specific hardware. We'll also tell you what enhancements you can expect to see if you upgrade to a more advanced videocard. Is your PC ready to run *Half-Life 2?* Let's see, shall we?

Copyrighted material

What does an 80-foot, laser-cannon toting, three-legged alien do for fun in *Half-Life 2*? Gives your PC a hernia, that's what!.

Copyrighted material

Inside the Engine: Half-Life 2

Creating a lush, realistic environment in a computer game isn't a trivial task. There are three main elements in first-person shooter maps that need to be considered. First, the designer must tie together thousands of polygons to create a 3D wire-frame that represents the shape and size of the game world. Second, an artist applies textures to the faces of those polygons to give them the appearance of real-world materials, like brick, wood, and rock. Finally, the designer positions lights so the world has bright areas and shadows. After these basic elements are created, developers write shader programs that impart surfaces with texture—water is rippled, metal is made shiny, and fog is rendered with realism.

Valve's goal with its *Half-Life 2* Source engine is to make *everything* in the game look positively life-like (if not otherworldly). That's the beauty of DirectX 9 programmable shaders, and here's how Valve put them to use (not all the effects below are DirectX 9-reliant, but all of them are undeniably cool).

CAMERAS & MONITORS: The Source engine takes surveillance cameras to an unprecedented level. In all previous games, cameras are fixed on a specific area, but in *Half-Life 2,* you can actually move the position of some cameras at will, so whatever the cameras are pointing at will appear on the appropriate monitors. Perfect for peeking around corners to see what adventures await!

BUMP-MAPPING: Nearly every surface in *Half-Life 2* has been treated with some sort of bump-map. Bump-maps add surface variations to otherwise flat textures. For example, adding a bump-map to a brick wall texture gives the final product a more realistic surface, with actual grooves between bricks where the mortar is. Using *Half-Life 2's* materials system, a programmer or artist can add a bump-map to all instances of a texture in the entire game.

SPECULARITY: In the real world, most smooth surfaces are shiny, or at least have a sheen, so *Half-Life 2* adds specular shine to bump-mapped surfaces that would be shiny in the real world, like these tiles. Like all other material systems (bump-mapping, sound properties, and lighting properties), specularity is controlled by the engine on a texture-by-texture basis.

TEXTURE VARIETY: We've all played entire games where the same boring wall and floor textures are repeated throughout, right? Well, in *Half-Life 2* there are at least two textures assigned to almost every surface in the game. One is the basic texture, used for videocards with 64MB or less RAM, and the other is the best-case texture, which adds variation and extra detail over the basic texture. If the basic texture is of a brick wall, the best-case texture might have a vine over the brick wall.

REFLECTIVE AND REFRACTIVE WATER: Reflective water is no longer anything to get excited about, but refractive water—which can "bend" incoming light—is new and cool. By making the water reflective when viewed at certain angles and refractive at lesser angles, the pool appears more realistic. The effect is difficult to appreciate in this screenshot, but it's the small subtleties that add to a greater overall impression of realism in a 3D game.

Copyrighted material

BUMP-MAPPED DISPLACEMENT MAPS: *Half-Life 2* takes a basic, low-poly-count 3D mesh, then adds more detail by combining it with a displacement map—a small grayscale bitmap—to describe how the vertices in the mesh should be deformed. At that point, the surface can be textured and bump-mapped like any other surface in the game. The really nice thing about displacement maps is that they make it easy to change the level of detail for terrain by scaling the resolution of the displacement map up or down. In the game, displacement maps are used for terrain and some cave walls.

VOLUMETRIC EFFECTS: Unless you live in San Francisco, fog usually isn't something that approaches in giant, flat, walls that reach from the ground to the sky. In the real world, fog is usually patchy and uneven. By using volumetric textures to describe fog, smoke, and clouds, *Half-Life 2's* atmospheric effects look more realistic than we've ever seen before.

LEVEL OF DETAIL: Getting a bleeding-edge DirectX 9 game running well on hardware that's more than four years old is no minor feat. The secret is to ensure that every object in the game can be scaled down to lower levels of detail. The cranes in the background of this shot are models—just like the buildings and ships—but because they're far off in the distance, the engine draws only a few polygons to represent them. As you approach the docks, the cranes' level of detail ramps up, without any change noticeable to the player. If you run the game on older 3D cards, however, the engine just draws models in one of the lower detail settings all the time.

DETAIL PROPS: Detail props are set pieces that add realism to *Half-Life 2's* environment, but they aren't manually placed. Instead, designers associate a few prop models with a particular texture, and let the engine handle placement of the actual models whenever that texture is present. Look for detail props to draw most of the grass and rocks in *Half-Life 2*.

STATIC PROPS: Once you've nailed down your basic environments, you need to fill in all those big empty spaces with the detritus of life: desks, chairs, barrels, crates, and the rusting hulls of old ships. These props are manually created and placed by the designer, and may or may not be interactive. In *Half-Life 2,* the player can pick up and toss around most of the smaller static props, but don't expect to move any giant ships, young Padawan. Yoda you are not.

PARTICLE EFFECTS: If a bullet hits water, it makes a splash. If a bullet hits metal it makes sparks. If a bullet hits brick, chunks of brick blast off. Thanks to *Half-Life 2's* materials system, the engine knows what type of particles to create when any object impacts a surface.

FRESNEL REFLECTION: If you walk toward a pool of water, the way it reflects light will gradually change. When you're far away, the water is fully reflective, but as you get closer, the water loses its reflective properties, and you start to see what lies beneath the surface. When you stand right next to the water and look down, you can see directly into it. Fresnel reflections describe how much light is reflected and refracted whenever light crosses from one material to another. The Source engine implements Fresnel reflections for water—if your videocard has the juice to draw it.

Copyrighted material

Judgment Day: Can Your Card Handle the Truth?

Does your videocard have the features to run all the visual effects? How about *any* of the visual effects?

You've seen what the Source engine is capable of. Now the question is, What will it look like on *your* hardware?

Valve designed *Half-Life 2* to run well on just about any videocard, from ancient two-pipeline DirectX 6 cards to modern DirectX 9 cards with eight-pipelines and advanced programmable shaders. Consider that in 1998 (when DirectX 6 cards were cutting-edge), shader programs were only used by Hollywood CG animators to render movies. This technology was *never* intended to run in real-time on lowly PCs. Yet it does today. In *Half-Life 2.*

In order to make the Source engine look fantastic on top-notch hardware yet still run on the lowliest PCs, Valve had to make some sacrifices to get decent performance on the low-end. In most other PC games, the final render looks the same regardless of the hardware the game is running on—older cards will just yield slower frame rates than newer cards, all effect settings being equal. But *Half-Life 2* is different. If you run *Half-Life 2* on an older card, it will simply default to lower-quality models, fewer unique textures, and even a different kind of sky. Yikes! Kind of makes you worried about your videocard's cojones, doesn't it?

The chart below describes which of the *Half-Life 2* visual effects your videocard is capable of, and which you'll need an upgrade to see. The programmers at Valve have simply set these features as their targets for the final game. As always, your mileage may vary.

VIDEOCARD	3D Sky	Volumetric Effects (smoke and fog)	Dynamic Refraction	Diffuse Shader Model	Radiosity-based Specular Bump-Mapping	Bump-Mapping	Texture Resolution	Texture Variety	Static Props (manually placed models)
DirectX 6 (TNT2, Rage 128, Voodoo5 5500)	no	no	no	fixed-function (software T&L)	no	no	128x128 and 256x256	none	low-detail, nonessential removed, no decals
DirectX 7 (original GeForce, original Radeon)	yes	sparse	no	fixed-function (hardware T&L)	no	no	256x256	low	medium-detail, some removed, few decals
DirectX 8 (GeForce3, Radeon 8500)	yes	yes	yes (limited usage)	Vertex Shader 1.1, Pixel Shader 1.1 - 1.4	world, viewmodel, static props, dynamic props, displacements	world, viewmodel, static props, dynamic props, displacements, NPCs	512x512	full	high-detail
DirectX 9 (Radeon 9700, GeForce FX 5800)	yes	yes	yes	Vertex Shader 2.0, Pixel Shader 2.0	world, viewmodel, static props, dynamic props, displacements, NPCs	world, viewmodel, static props, dynamic props, displacements, NPCs	512x512	full	high-detail

Copyrighted material

What's On, What's Off?

Half-Life 2 will look different on different videocards. How will it look on ours?

The first time you run *Half-Life 2,* it's going to inspect your hardware and tailor its visual quality settings for your videocard. This means the game is going to look vastly different when running on different types of cards. In this section, we explain the differences on a generation-by-generation basis. Don't worry if you don't know what generation your card fits in, because we've also included a big list of cards from each generation. Of course, if your card vendor has gone out of business, it's unlikely your card will have drivers that are current enough to even run *Half-Life 2.* This means you, 3dfx owners.

As for minimum CPU requirements, Valve had no comment, but we'll hazard that anything able to meet or beat the performance of a 2.5GHz Pentium 4 will be just dandy.

DIRECTX 6

DirectX 6 cards were the first modern 3D accelerators—state-of-the-art for 1998 and 1999. These babies had fixed pipelines capable of 32-bit color (previous cards were able to draw only 16-bit color), but lacked hardware support for triangle setup and lighting calculations. DirectX 6 was the standard when the original *Half-Life* (based on an enhanced Quake engine) debuted, and if your PC's motherboard features an integrated 3D accelerator, there's a good chance it's a DirectX 6 part.

Half-Life 2 on a DirectX 6 card will look a lot like the original *Half-Life.* The sky will be a simple bitmap, and there won't be any shiny, specular surfaces, or even rudimentary shadows. There also won't be any smoke or fog, or even simple dynamically placed detail props. But, hey, at least you should still be able to play the game! Maybe. Because DX6 cards shipped with many different memory configurations, it's important you make certain *Half-Life 2* supports your card, especially if it has less than 32MB of RAM.

Valve says that supported DirectX 6 cards will be playable at 640x480 and a decent frame rate, but we're skeptical. There may be some cards that work OK, but we doubt that the majority of DirectX 6 add-in boards will offer anything close to a fun experience (if you have a newer integrated chipset, you might have better luck). Regardless, a decent videocard upgrade can be had for less than $100, and this will get you out of DirectX 6 country.

	Dynamic Props (dynamically placed grass, rocks, etc)	Dynamic Shadows	Specularity	Water	Cameras/ Monitors	Displace-ment Maps (terrain, cave walls, etc.)
	no	no	no	ugly	2D Overlay	low-res
	no	blobby	only important objects	a little less ugly	in scene (if render-targets are supported)	medium-res
	yes (but only near the camera)	sharp render-to-texture	yes, with bump-map and fresnel	pretty nice (with volumetric fog)	in scene	med to high-res (with bump-mapping)
	yes (all over)	soft render-to-texture	yes, with bump-map and fresnel	very nice (with volumetric fog)	in scene	full res (with bump-mapping)

DIRECTX 6 CARDS

Any nVidia TNT2
ATI Rage 128
Any S3 Savage 3D
3dfx Voodoo 3
Matrox G200
Most 3D chipsets integrated on the mobo

DIRECTX 7

DX7 cards ushered in the hardware T&L engine. Instead of dumping triangle setup and lighting duties on an already overburdened CPU, a DX7 videocard taps its "transform and lighting" engine to do these calculations—faster and more efficiently. The upshot is that DX7 cards can draw scenes an order of magnitude more complex than DX6 cards.

Naturally, a DirectX 7 card can let you run more of *Half-Life 2's* features. Instead of a flat 2D sky, you'll see a fully rendered 3D skybox. You'll also see rudimentary shadow blobs, some shiny specular highlights, and some volumetric fog. Because DirectX 7 cards shipped with more memory than DirectX 6 cards, there's also more room for variation in the textures the game uses for walls, ceilings, and floors. You can also expect to see some decals where explosions scar surfaces, bullets ricochet off walls, and blood splatters on floors.

Copyrighted material

We expect any card with hardware T&L to play the game at a decent frame rate and resolution—it just won't enable any fancy features. Even though you'll get playable frame rates with your DirectX 7-class card, a 3D accelerator in the $100 to $150 price range will perform better, and make *Half-Life 2* prettier.

DIRECTX 7 CARDS
Any nVidia GeForce with SDRAM
Any nVidia GeForce DDR SDRAM
Any nVidia GeForce2
Any unnumbered ATI Radeon
ATI Radeon 7000 series
Any nVidia integrated nForce graphics

Everyone wants to reach out and touch someone occasionally, even nasty aliens. While we can admire the reflective—and refractive—water, this poor sap is probably fixated on the energy tentacle poking through his chest. Note that the hydra's dynamic blue glow is shining on the water, walls, and Alyx.

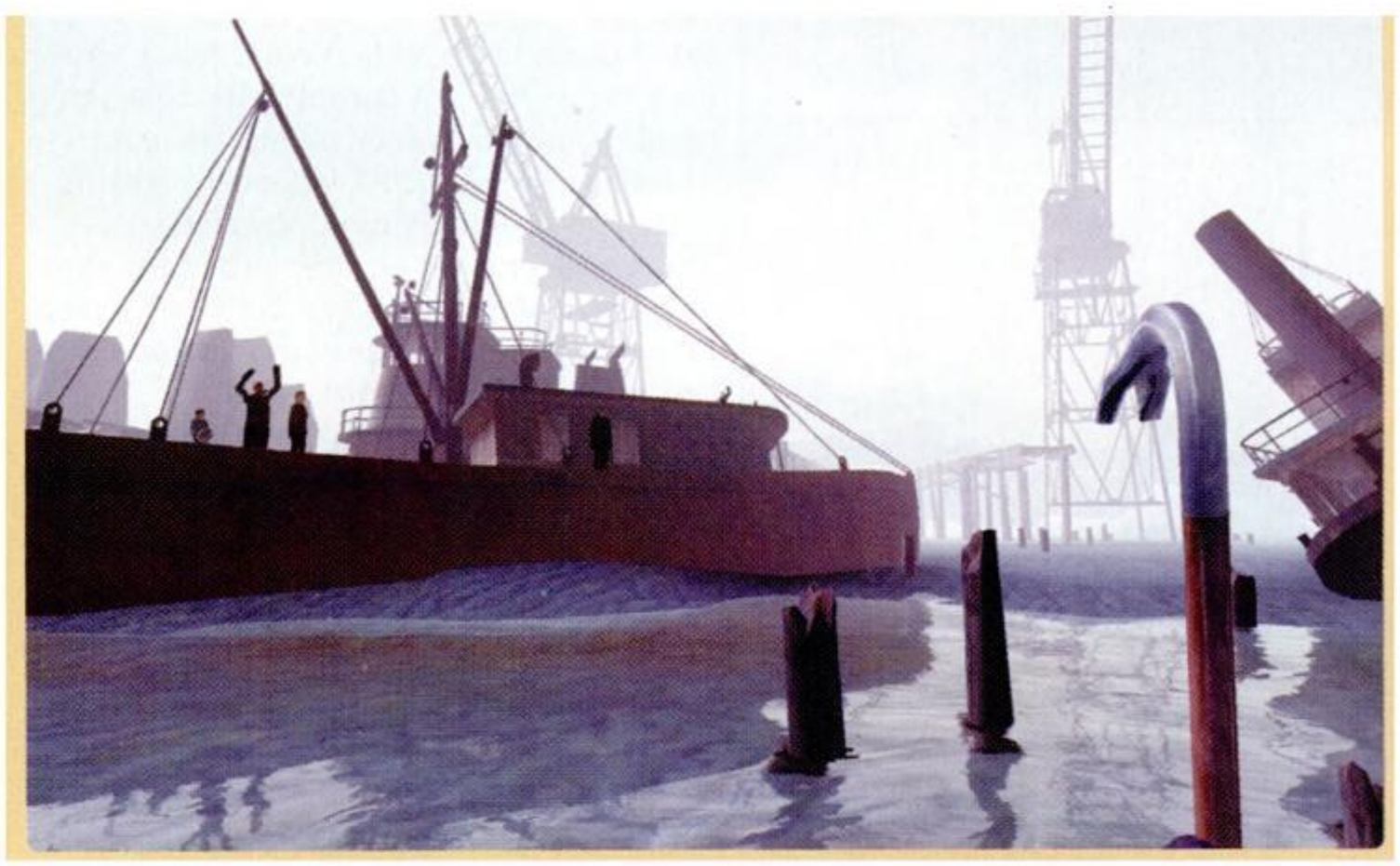
DIRECTX 8

DirectX 8 cards were the first to include programmable shaders on the GPU. These cards' shaders are rudimentary by today's standards, but are very good at bump-mapping. *Half-Life 2* on a DirectX 8 board will have bump-maps on almost every surface in the game.

On a DX8 card, *Half-Life 2* will use the Vertex Shader 1.1 spec and whichever version of the DX8 Pixel Shader spec that best suits your hardware—1.1, 1.2, 1.3, or 1.4. Expect to see shiny, bump-mapped water—with Fresnel reflections!—in every puddle, pond, and bay. Unlike less advanced cards, DX8 cards are also fast enough to reliably draw the output from in-game cameras. Detail props make their first appearance too, and will show up anywhere there should be rocks or grass. You'll also see the game render real dynamic shadows (albeit with straight edges). On a DX8 card, almost everything in the world can receive specular highlights; only in-game character models are the notable, non-shiny exception. Most importantly, owners of DirectX 8 class cards will see every texture, at its full resolution, exactly as the level designer intended.

A DX8 videocard won't give you all of the game's visual treats, but you'll get most of the big ones. Upgrading to something newer will cost you at least $200, and depending on what card you have now, a videocard upgrade may not be faster, just more fully featured. That said, the Radeon 9600 and 9800 cards, and the GeForce FX 5600 and 5900 are great upgrades.

DIRECTX 8 CARDS
Any nVidia GeForce3
Any nVidia GeForce4
ATI Radeon 8500
Any ATI Radeon 9000
Any ATI Radeon 9200
Matrox Parhelia
Any SiS Xabre



Here you can see Fresnel reflections on the water, volumetric fog, and a specular shine on Gordon's trademark crowbar. The patchy volumetric fog makes objects in the background really appear to be in the background.

DIRECTX 9

A DirectX 9-compliant videocard sports the most advanced fully programmable pixel shaders available today. Boasting support for 128-bit floating-point color, Pixel Shader 2.0, Vertex Shader 2.0, and sky-high clock speeds, the graphics chips on DX9 cards sport more transistors than even CPUs!

Running *Half-Life 2* on your DirectX 9 videocard will showcase both the game and your 3D card's capabilities. You'll see detail textures to the horizon, and specular highlights on everything, including other characters. All the characters will cast dynamic shadows, complete with realistic, fuzzy edges. All the water will use Fresnel reflection to determine whether it should reflect or refract light. The game will even include

Copyrighted material

And What's up with Doom3?

Here's what we know about the *other* mind-blowing magnum opus

Half-Life 2 will look awesome—our screenshots prove as much. But how will its graphics compare with what you'll find in _Doom3?_ Well, _Doom3_ is also a work in progress, so it wouldn't be fair to even hazard a guess, but from what we've seen, it looks like _Half-Life 2_ uses more advanced shaders than _Doom3_. While _Half-Life 2_ wholeheartedly embraces all the visuals offered by DirectX 9 (including its High Level Shader Language), _Doom3_ is an OpenGL game. And because the OpenGL standards body has yet to define a C-like shader language, _Doom3_ uses assembly-style code analogous to DirectX 8 shaders.

Using assembly-style code doesn't mean that _Doom3_ will look worse than _Half-Life 2_. In fact, from what we've seen, _Doom3's_ shadows actually look more realistic than _Half-Life 2's_. But the problem with writing shader in assembly is that the developer has to write a tweaked version of the shader program for each piece of hardware it's going to support. In contrast, DirectX 9 shaders usually work seamlessly on all videocards.

The practical upshot is that you should expect to see many more shaders programs running in _Half-Life 2_ than in _Doom3_.

Another significant difference between the two games lies in their lighting systems. _Half-Life 2_ uses a mixture of static and dynamic lights throughout the game, but _Doom3's_ lighting system is fully dynamic. Dynamic lighting calculations are significantly more complex, but look very real. Both games feature self-shadowing models and dynamic shadows with indistinct edges, just like in real life.

The release date for _Doom3_ is still "when it's done," but we don't expect to see it until early 2004. Guess this extends _Half-Life2's_ half-life by quite a while!

These six-legged freaks cast the best shadows we've seen to date in a game. Smooth, but indistinct edges are hallmarks of a good shadow renderer—and are made possible by pixel shaders.

No one appreciates the plight of the flaming disembodied heads of the world as much as we do. Notice the light the flames cast on the wall—it flickers.

volumetric fog to limit your underwater vision. Bump-mapped displacement maps will add even more detail to the terrain and cavern walls. We should also note that when you run *Half-Life 2* on the next generation of videocards (DirectX 10), the game may run faster than anything you'll see on a DirectX 9 part, but won't look any better.

While there are DirectX 9-compliant cards that start at around $120, our guess is that their slow clock speeds and narrow memory pipelines won't be able to keep up with *Half-Life 2's* demanding requirements. We can't make any real hardware recommendations yet, because we haven't tested the game, but we'd much rather have a card that's too fast than one that's too slow. Right now, the two fastest videocards are the ATI Radeon 9800 Pro and the nVidia GeForce FX 5900 Ultra. Both are very expensive, costing between $400 and $500 depending on memory configs. That's a lot of jack, but you can rest assured that both will run *Half-Life 2* as it's meant to be seen. ■

DIRECTX 9 CARDS

Any nVidia GeForce FX 5200
Any nVidia GeForce FX 5600
Any nVidia GeForce FX 5800
Any nVidia GeForce FX 5900
Any ATI Radeon 9500
Any ATI Radeon 9600
Any ATI Radeon 9700
Any ATI Radeon 9800

Copyrighted material

It's the foundation of every single PC, but most folks will never know it's there, much less what it's capable of. It's called the BIOS, or basic input output system, and it's the intermediary between your PC's hardware and its most important software component, the operating system. Without the BIOS, the OS can't gain control of your machine's hardware and make it do the work you want.

If you're at all serious about wringing every last delicious drop of performance from your rig, it's necessary to understand the BIOS and the role it plays in the functioning of your PC. Even if you're perfectly happy with the speed of your PC, would you know what to do if a mysterious failure suddenly stopped your machine's boot process? Whether by choice or circumstance, every power user has to face the BIOS at some point. Think of it as a rite of passage. But you don't have to go into it unprepared.

In the next few pages, we're going to let you in on the secrets of the BIOS and how it ensures that your PC's software and hardware play nice. We'll dissect the boot process overseen by the BIOS, and give you a blow-by-blow of the flurry of activity that takes place during those brief moments before the OS takes control of your machine. You'll get to know the history of the BIOS, and sneak a peek at what the future holds for this vital software component, especially as it expands into new territories such as handheld devices and wireless telephones.

Yes, it's a little scary, and if you're a newbie, there's no telling what's on the other side. Don't sweat it—we're here to guide you.

—SIXTO ORTIZ

Your PC's health depends on what happens shortly after you press the power button. Here's everything you need to know about the mysterious machinations of your BIOS—a play-by-play analysis of its first 30 seconds of life.

Copyrighted material

What is the BIOS?

The BIOS is a set of all the hard-coded instructions and drivers needed to start your PC before other software—namely, your OS—can take over.

The modern desktop computing revolution began in the early 1980s with IBM's Personal Computer, which featured an early version of a system BIOS. In those days, glaring incompatibilities between systems manufactured and sold by different PC vendors were the norm as competitors fought for market share and consumer acceptance. Naturally, Big Blue engineers decided that keeping their system BIOS proprietary was an excellent way to maintain a market advantage.

But it wasn't long before IBM's wily competitors (most notably, Compaq) were able to develop system BIOSes of their own to bridge the gap between hardware and the OS. The death knell for IBM's BIOS supremacy came in 1984, when Phoenix Technologies launched a system BIOS designed for generic PC clones. However, what was not so good for IBM was great for the nascent PC industry, because it led to the creation of a standardized BIOS that would work well with *all* existing CPUs.

Scott Mueller, author of *Upgrading and Repairing PCs*, explained that early versions of the BIOS code contained all the device drivers necessary for a PC to run. "Back in the early days," Mueller said, "all the device drivers you needed were in the BIOS stored in the motherboard ROM." As the amount and types of hardware devices increased, it became necessary for the BIOS to communicate with the ROM (read-only memory) embedded in add-on cards to load the drivers necessary to run them.

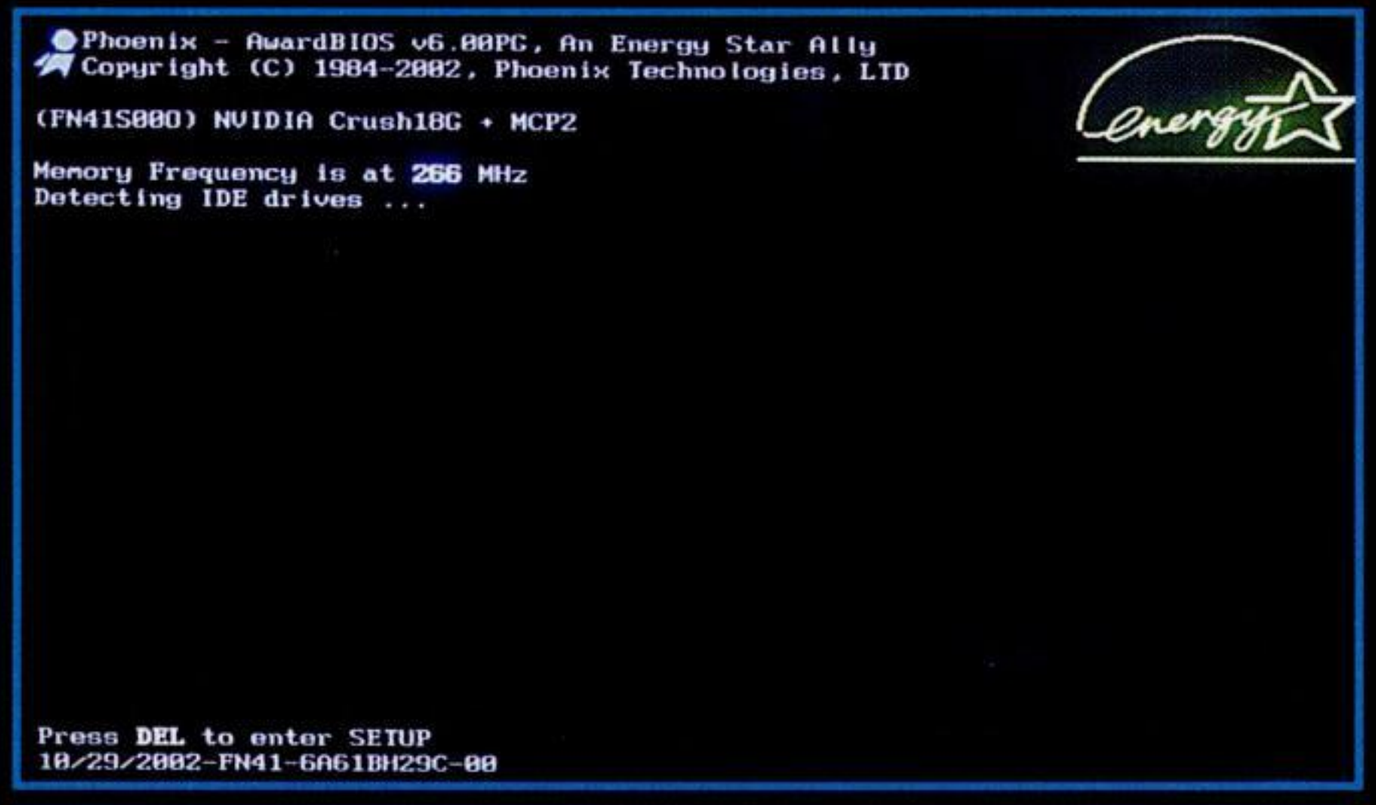
Ultimately, the OS took responsibility for loading the majority of device drivers, by checking the CONFIG.SYS file for drivers that required loading into system memory. This was necessary to support devices that were at that point not standard in most PCs, such as soundcards.

Today, the BIOS embedded in your mobo's CMOS chip is likely made by one of two principal manufacturers: AMI or Phoenix. Some computer OEMs, notably Dell, still develop their own BIOSes in-house (so that the BIOS can address proprietary hardware, among other reasons). But the vast majority of OEMs license their BIOSes from one of the Big Two. BIOS developers must keep up with the continuous barrage of new standards and configurations being developed in the PC world. BIOS developers must work closely with hardware OEMs to ensure their code will work well in various hardware environments.

The little chip that could

The BIOS itself is a set of software instructions written to a hardware chip located on your motherboard. The BIOS instructions are permanently written to ROM, so they cannot be overwritten by new instructions (unless the BIOS is "flashed"—more on that later). Permanently writing the BIOS instructions is necessary, simply because they are the very first instructions a CPU executes when the juice is turned on and the system comes to life. Without hard-coded instructions, the CPU wouldn't have any idea what to do after the power comes on.

continued on page 36



You get just a few moments during boot to check out your BIOS make and version number. At the top of the screen we can see that our BIOS is made by Award and is version 6.00PG.

Identifying and Breaking into the BIOS

It's a good idea to make a note of your BIOS manufacturer and revision, preferably *before* disaster strikes. If you are experiencing a fatal system failure, and the only way your BIOS can communicate is via a series of beeps, it behooves you to know the meaning of those beeps.

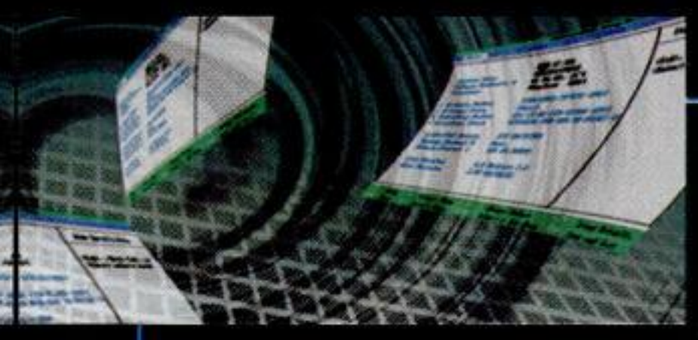
The simplest way to determine your BIOS manufacturer and the revision number is to wait for the info to appear on your screen at the very beginning of the boot process (it will appear at the top of your screen). You need to be quick, because this information will be apparent just briefly before it vanishes. Don't forget the revision number. If you miss some of the information, just reboot and try to catch it again.

Another way to identify your BIOS is to use one of the many hardware analysis utilities available today that display extensive system information. For example, *SiSoft Sandra* features a module called "CPU and BIOS Information" that analyzes your system and collects this data. These utilities typically work within the Windows environment, and generate extensive reports describing your system's inner workings.

Every modern BIOS uses a setup program that displays and allows you to edit BIOS settings. Setup presents these settings in a menu-driven environment that's easily maneuvered with your keyboard. Most BIOSes briefly display a message telling you how to enter the setup program. But if you don't see that, or get a manufacturer logo screen instead, try pressing either Del or F1 after you power up. If that doesn't work, check the documentation that came with your motherboard.

Once you've busted into the BIOS, take some good advice from people who know: Be careful. A misstep here can render your system unbootable. Fortunately, it's almost always possible to go back into the BIOS if something goes awry to either manually undo your changes or even revert to the factory defaults.

Copyrighted material



ENTER THE BIOS

continued from page 35

The CPU relies on the BIOS, and the BIOS depends on yet another chip on your PC's motherboard—the CMOS (complementary metal oxide semiconductor). The CMOS contains a tiny amount of RAM, backed up by battery power, that stores all the custom setup information about your PC. Your BIOS doesn't have any of its own addressable RAM, so it looks to the CMOS during every boot up to "remember" what your hardware settings are. Some of the system information stored in the CMOS chip includes data about the main hard disks in your system, such as the number of cylinders, heads, and sectors, as well as the relationship of the drives (slave or master) to each other. The section detailing the system hard disks also features an automatic calculation of the disk size, based on the number of cylinders, heads, and sectors. In addition, the CMOS stores information about floppy drives, EIDE settings, the primary display, and your keyboard. In a sense, the CMOS is like a fingerprint for your system, uniquely identifying the hardware configuration of your machine.

The BIOS resides on your motherboard's CMOS chip, shown here.

And the moment you turn on your PC, the BIOS accesses this fingerprint in order to rouse all the hardware in your rig.

Enter the BIOS

The BIOS is a lot like the early-bird office worker who turns on the lights, starts the first pot of coffee, and gets the office ready for everyone else. For your computer to work after you power-up, there's an initial set of instructions the CPU must execute so everything gets started properly. Those firmware (software contained on a read-only memory chip) instructions comprise the system BIOS.

When the PC is first powered on, the CPU resets itself and executes 16 bytes of code found at memory address FFFF:0000h. This address contains a jump instruction telling the CPU where to find the bulk of the BIOS code. Once the BIOS is initialized (meaning, essentially, that it's awakened and sent off to work), it takes control of the computer and begins collecting the system information stored in the CMOS. This informs the BIOS of the various hardware components that comprise your system and provides a "checklist" for initializing and testing these parts.

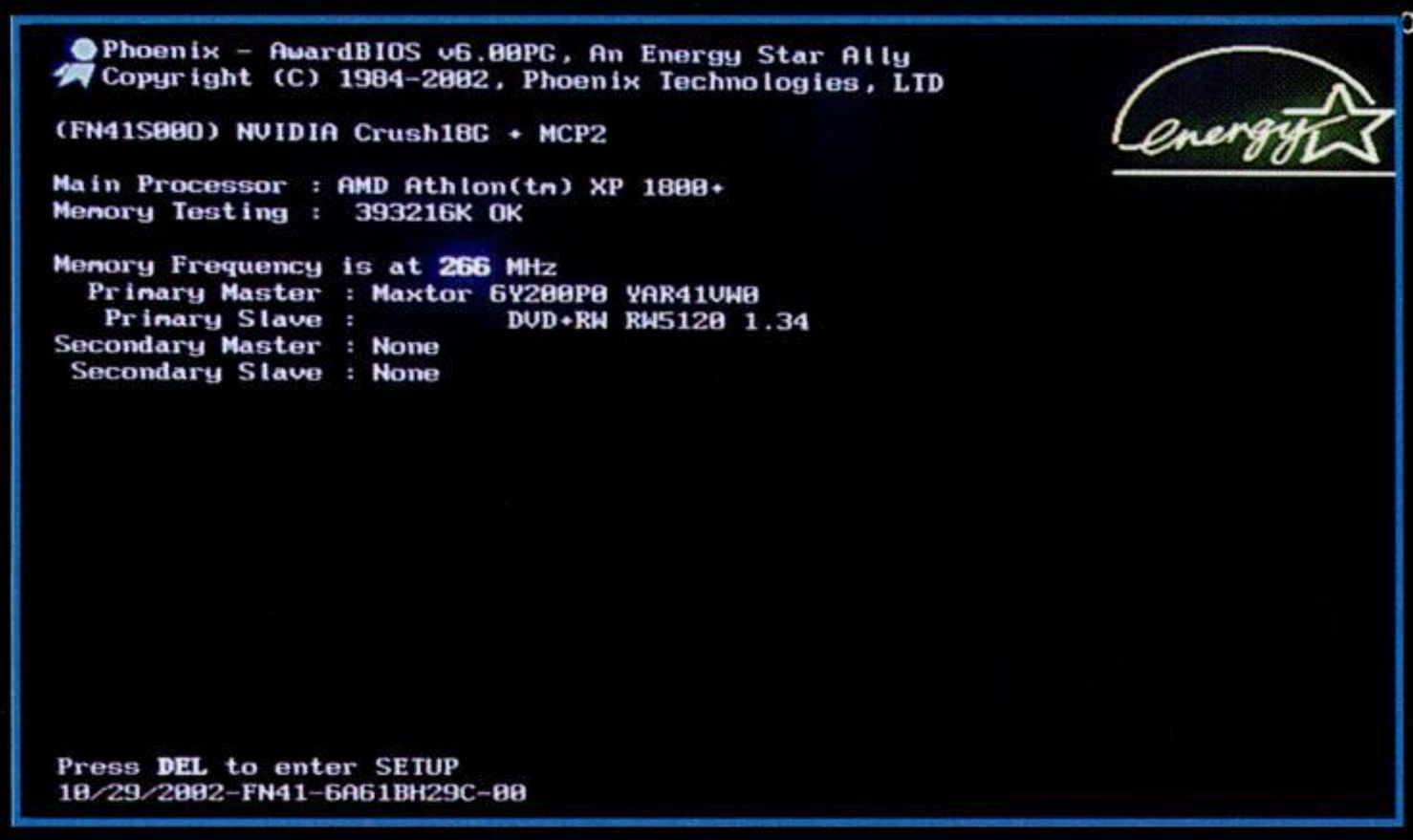
This process is called the *power on self test* (POST), and it's a critical routine. If something goes wrong and a hardware device experiences a failure, the BIOS can help you pinpoint the offending part with a series of beep codes (otherwise, you'd be stuck with a nightmarish diagnostic ordeal). Some of these failures are fatal and halt the boot process. Other times, the errors are nonfatal and the boot process is able to proceed, but the BIOS still notifies you by displaying an error message. (You can find an extensive list of BIOS error beep codes in "Don't Fear the Beeper" from our March 2003 issue.)

If there's trouble during the boot process, most BIOSes output the numeric code (also known as a checkpoint code) generated by a specific POST task to I/O address 80h. If you look at your BIOS user's manual, you will find a list of checkpoint codes that correspond with the various activities of the POST routine. This means you don't have to rely entirely on beep codes to determine what's ailing your system, if you can somehow display the information that the BIOS has sent to I/O 80h. Fortunately, you can purchase a POST card that will do just that: display

Micro2000's POST-Probe BIOS card ($400, www.micro2000.com) can help you diagnose a dead PC.

the various checkpoint codes as the boot process progresses on an LED display located on the card itself. When the system halts at a particular numeric code, look up the code definition in your BIOS user's manual to identify the exact cause of the problem.

The number of tasks the BIOS performs during the initial "boot-time" POST sequence is impressive; the list of codes in "AMIBIOS8's Check Point and Beep Code List" contains more than 60 line items describing the various tasks. One of the common tasks done by the BIOS during the POST, for example, is testing the system RAM to ensure that the amount of RAM in the system matches the amount of RAM recorded in the



After the initial power on self test (POST), the BIOS inventories your hardware before handing over control to your OS.

Copyrighted material

CMOS. This is when you hear the "clicking" sound from your PC's speaker and your monitor displays a dynamic inventory of RAM as the BIOS "counts" and tests the system RAM. This is the essence of a BIOS task: first, to verify that the component is in fact still present, and second, to make sure it's working properly.

In the course of the boot-time POST routine, the BIOS initializes and configures all the system hardware, beginning with the most fundamental (i.e., the CPU, the system memory, the chipset, and DMA channels) and progressing to other more advanced but less crucial features, such as power management settings. Thus, some of the very first tasks, or checkpoints, performed by the BIOS during the early stages of the POST include initialization of the CPU and related L1 and L2 cache operations, verification of the CMOS checksum (to ensure your CMOS battery is still functioning properly), initialization of chipset registers, initialization of input devices such as the keyboard and mouse, and the initialization of your system's video adapter. As the boot process continues, the BIOS initializes other hardware components in your system, such as the floppy drive, the hard disk(s), and the serial and parallel data ports. Finally other components, such as CD drives and soundcards are initialized, and any plug-and-play and power management features are turned on (although the OS may assume these functions later in the process). At the end of the POST routine, the BIOS passes control of the computer to the OS loader routine, which begins waking up the sleeping beast that is your operating system.

The most critical, if somewhat mysterious, role of the BIOS, is providing a layer of logic, so to speak, that connects the disparate hardware components in a system and makes them work as a cohesive whole. Without the BIOS, the OS would have to orchestrate the orderly communication between a whole gaggle of electronic components connected via a system bus, all of which would be vying for the CPU's attention to get work done. The BIOS, by assuming this important role, saves OS and application developers from having to become intimately familiar with every single piece of hardware that could possibly find its way into someone's beige box—a virtually impossible task. This principle is called "complexity shielding," and it's a cornerstone of modern information technology standardization. (It's equivalent to the seven-layer OSI, or open system interconnection, networking model, which conceptually describes a network as a series of layers, starting with hardware and culminating with specific applications. It allows OS developers, and ultimately application developers, to focus on other aspects of software development without having to concern themselves with the hardware details.)

This is the real magic of the BIOS, which Scott Mueller calls "the compatibility glue between the OS and the hardware." It's what allows users to install the same version of an OS on thousands of different systems, with wildly different hardware configurations.

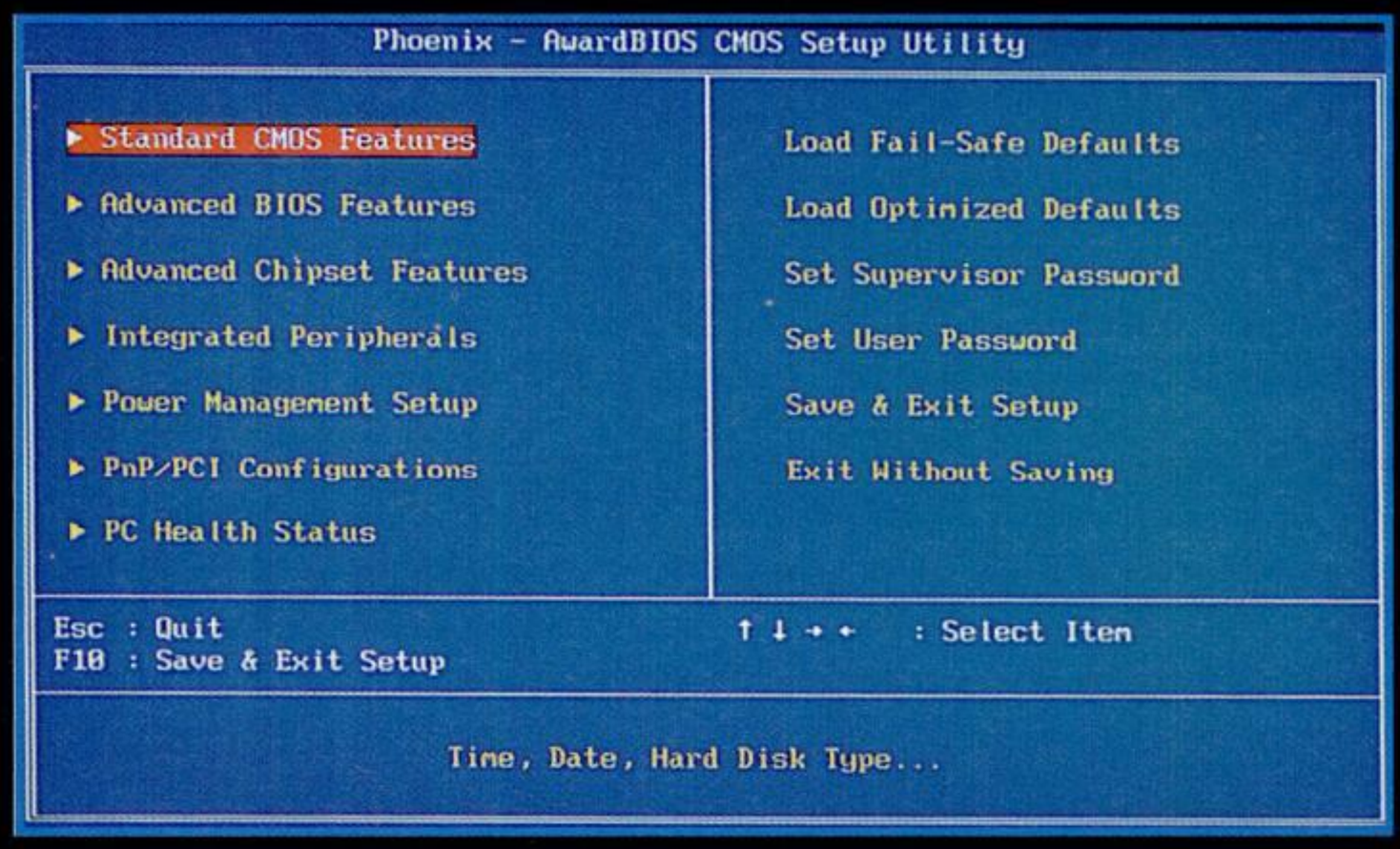
In the not-too-distant past, the BIOS managed the communication among hardware components via a system of software interrupts that "called" on specific BIOS subroutines in the motherboard ROM, BIOS instructions in ROM on ancillary devices such as add-in cards, and device drivers loaded into RAM from disk (such as 32-bit device drivers). To communicate with a hardware device, the OS or a software application made a call to a particular software interrupt. The BIOS then used what's known as an interrupt vector table containing information about all the system interrupts to route the call to the appropriate BIOS/driver code. It's important to note that the concept of the BIOS here encompasses all the device drivers that make the system work, whether they exist within the motherboard ROM, ancillary ROM chips on other devices, or in RAM. It is the communication established via this system of interrupt communication that makes this seemingly disparate set of software and hardware components work together.

With modern operating systems such as Windows XP, the role of the BIOS in managing interrupts is greatly reduced. For this we can thank the advent of 32-bit, easily upgradeable drivers that load from disk into system RAM. Scott Mueller predicts that "eventually the days of motherboard ROM upgrades will be in the past, as their functionality will be simplified and minimized to the point where they will require virtually no attention."

The BIOS of the future

While the ROM BIOS's role in the ongoing functioning of a PC is reduced once the OS takes over in modern systems, the crucial oversight of the boot process from start to finish and the initialization and testing of hardware devices will continue to be the most important steps in preparing a PC for OS control. BIOS developers still actively work with the major CPU and chipset developers (such as Intel) to ensure that the latest BIOS code is in step with new technologies and architectures.

continued on page 38



This is typically the first screen you'll see once you've entered the BIOS. Navigation instructions are almost always found at the bottom of the screen, or to the far right.

Copyrighted material

ENTER THE BIOS

continued from page 37

In fact, explains Mark Erickson, FirstBIOS senior marketing director for Phoenix Technologies, hardware technologies, such as Serial ATA and wireless connectivity, are rapidly advancing and thus demand new levels of capability from the BIOS code. There is also a focus, Erickson adds, on intelligent core services, such as device authentication and trust, a secure and customizable console for access to primary services (another term for services accessible through the BIOS interface), and applications that provide diagnostics, system recovery, and even "self healing" in the event of trouble.

BIOS developers are also finding a role in the burgeoning world of portable, mobile devices, such as Tablet PCs and PDAs. BIOSes designed for mobile devices will have to contribute by providing advanced services such as connectivity, identification, and manageability (hooking into a network with a minimum of fussing around).

Overall, the importance of the BIOS to PC architecture will endure as long as device drivers continue to play a role in ensuring that an OS can communicate with hardware. Although the folks at Microsoft could conceivably shift every single task performed by the BIOS to the operating system, there still needs to be some component that turns on the lights and starts the coffee. Expect such an interface between the hardware and software to persist for the foreseeable future.

And every time you boot up your PC, you're looking at it. ■

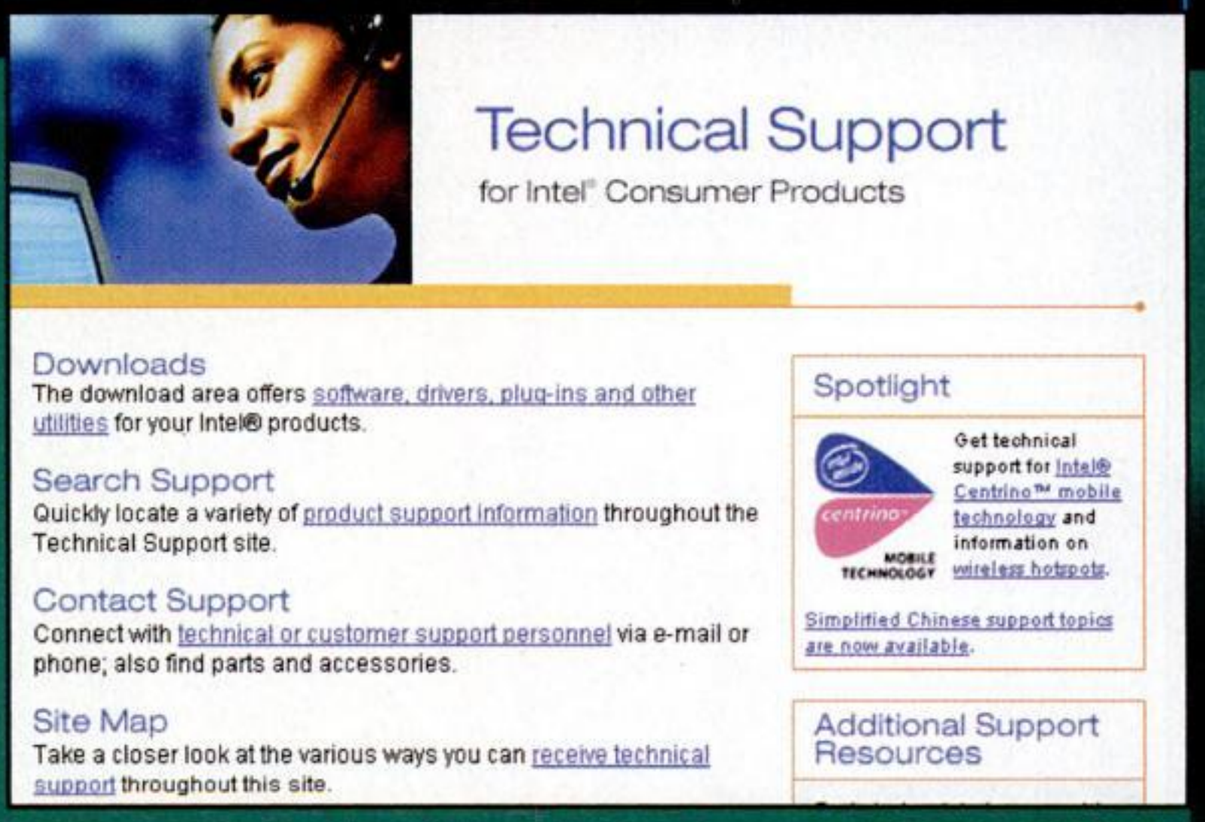
Flashing Your BIOS

Modern BIOSes are written to flash memory chips, a type of EEPROM (electrically erasable programmable read-only memory) that can be erased and written to many times over. This technology makes it easy for end users to retrieve BIOS updates from the web and perform a BIOS upgrade via a simple setup procedure

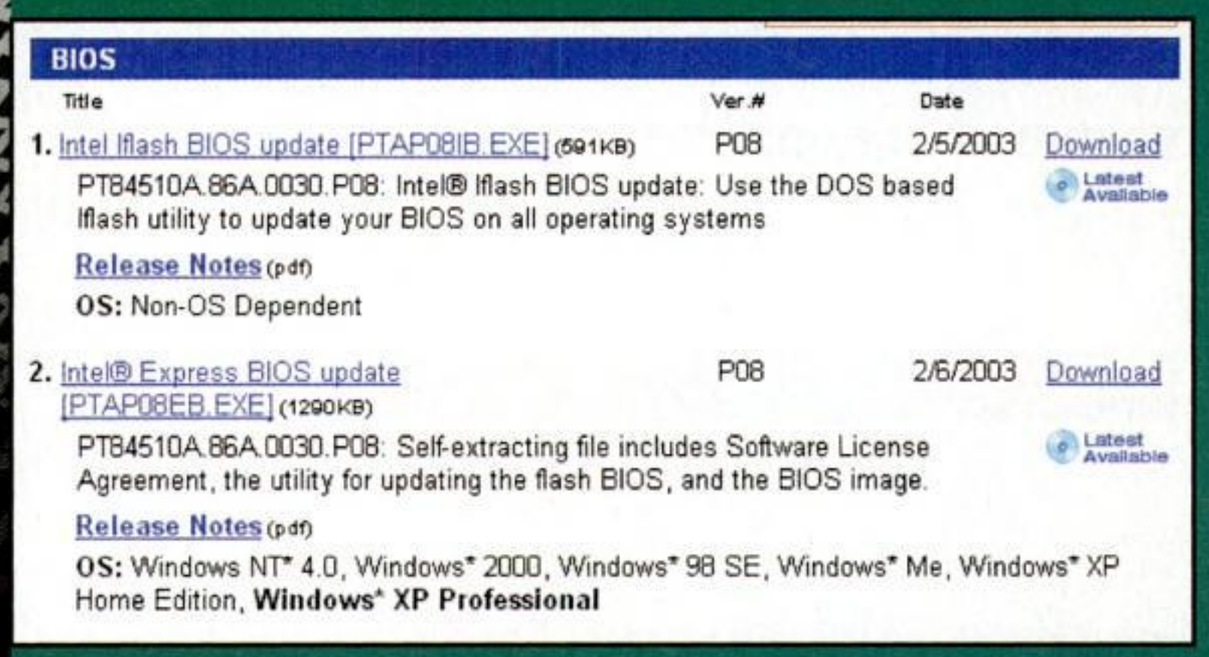
So why would you want to flash your BIOS? For starters, it's a good place to start when troubleshooting vexing computer problems. If your rig is acting up and the solution to the problem is not obvious, flashing the BIOS might just be the answer you're looking for. Even if you aren't experiencing problems, it's a good idea to periodically get your BIOS instructions up to date. BIOS developers now regularly post BIOS updates to their web sites, with the latest enhancements and fixes.

Flashing a BIOS typically involves downloading a small file from your motherboard manufacturer's web site (or from the web site of the retailer that sold you your PC). Do *not* go to the BIOS developer's web site—your motherboard or system manufacturer may have a BIOS tailored specifically for the board you own. If you're lucky, all you'll have to do is execute the file and follow the prompts. Some vendor's flash routines may insist on being copied to a floppy disk.

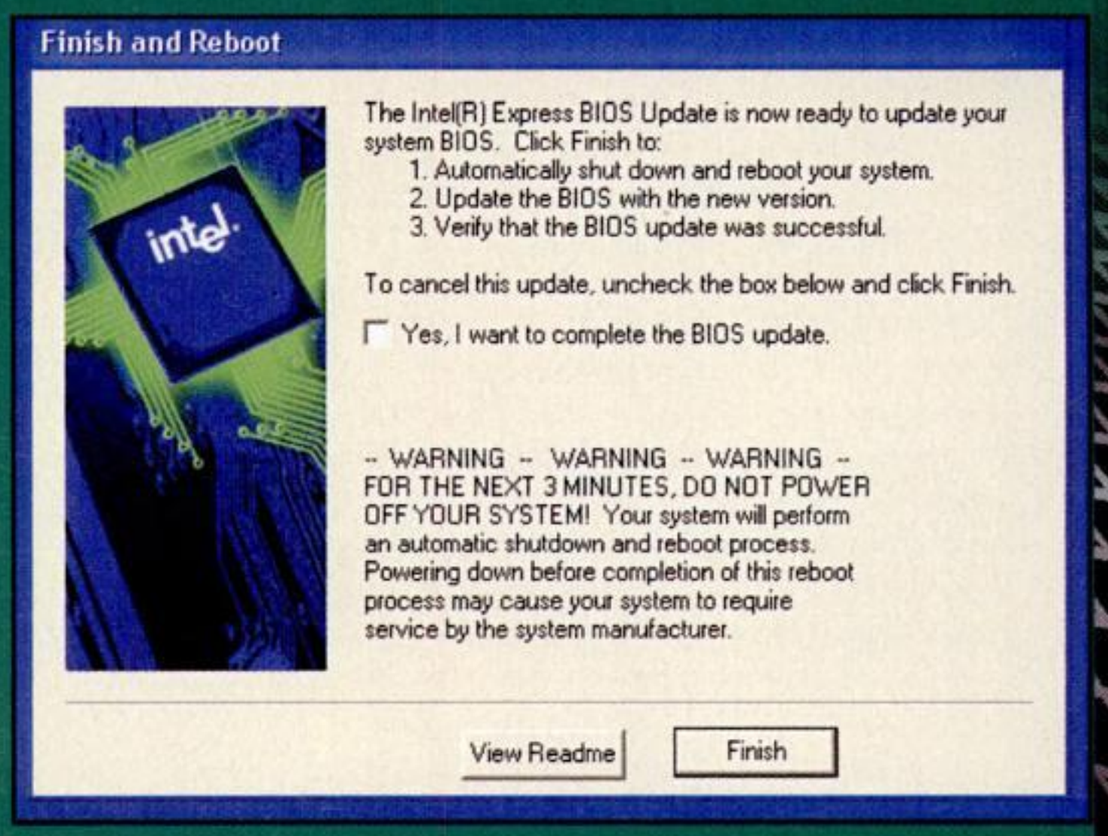
When you flash your BIOS, follow all instructions to the letter, and whatever you do, *do not interrupt this procedure!* Doing so could be the death of your motherboard, and the end of your patience.



Go to your motherboard manufacturer's support site for BIOS updates.



If available, download the Windows-based flash utility, shown here as download #2.



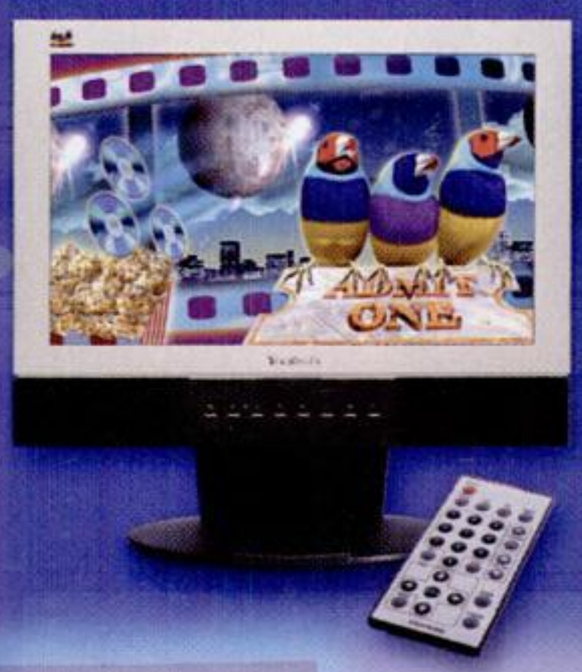
Intel's BIOS flashing utility is a point-and-click affair, but once you've clicked, do not interrupt the process!

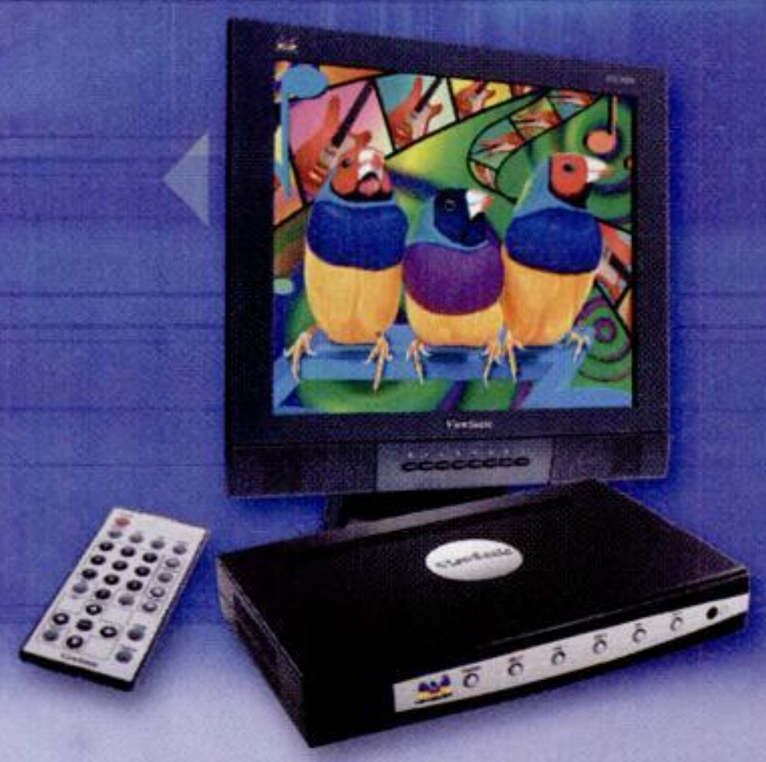
Copyrighted material

That's Entertainment, ViewSonic® Style.

With ViewSonic, entertainment doesn't cost more, it simply looks better. TV, gaming, music, home movies and digital photos are an integral part of life. With breakthrough video processors and digital media centers plus widescreen HD displays, ViewSonic merges all your entertainment options into powerful, easy-to-use technology with breathtaking image quality and fingertip remote control. For instance, the new VT550 15" LCD TV System is designed for both work and play with exceptional video screen performance, including 181 channel capability, complete multimedia functionality and off-the-desk video cabling at a fraction of the price of other LCD TVs.

Now Every Room Can Have A View





Uptime, downtime. Work and play on the same wide screen LCD TV. ViewSonic has made the desktop far more than a simple workspace. Now it's a virtual visual playground on the N1700w wide-format 17" LCD with its own 181 channel TV tuner and remote control convenience. With additional connections for PC, DVD player, VCR, gaming console and digital cameras, your desk chair may be the best seat in the house!

Enrich family viewing with spectacular next-generation technology. ViewSonic's big-screen 42" and 50" plasma displays coupled with the incredible power of the new M2000 Digital Media Center provide a larger-than-life entertainment experience that's as versatile as it is easy to use. Sit back with your remote and watch and record TV and DVDs, store, organize and play music, movies and more. On-screen menus make it all as easy as a click of the remote.

Expand your entertainment vision. Add TV to any monitor. Check out the complete line of advanced video processors from ViewSonic. They transform your display into a complete entertainment experience. Simple connections for high definition TV, DVD, VCRs, gaming consoles and digital cameras expand your desktop viewing capability for an amazingly low price. Use the remote to quickly switch between these options and your existing PC.

See your dealer today, contact ViewSonic at 1-800-888-8583 or visit ViewSonic.com.

ViewSonic®
See the difference.

Specifications and pricing subject to change without notice. Corporate names and trademarks stated herein are the property of their respective companies.
Copyright © 2003 ViewSonic Corporation. All rights reserved. [11002-00E 02/03]

Copyrighted material

Feel the POWER
Enjoy the SILENCE

The New Gold Series EG851 Power Supply

- 660W of continuous output sufficient for ***Intel Dual Xeon*** and ***AMD Dual MP*** CPU Server/Workstation
- Aluminum housing for the best heat dissipation
- High quality ***Sanyo*** fan offers durability and max airflow
- Copper shielding tube on Main Power, Processor and Workstation Power Output cables for better EMI reduction
- ***Intel EPS*** 12V and ***AMD ATX-GES*** Dual CPU server board fully compatible
- Active PFC, Full Range Input (90~264V)

Enermax is an industry leader in power supplies and peripherals since 1989. We strive in making the highest quality products the market has to offer and it is our commitment which earned recognition with over ten regional branches worldwide; including Asia, Europe and the U.S.

EG465P-VE FMA | EG651P-VE FMA | EG465P-VE FCA

EG851AX-VH

660W

CNS13438-3882A920

MAXPOINT.COM

ENERMAX

Maxpoint Computer, Inc.
17733 Rowland Street
City Of Industry, CA 91748
(626) 913-8899 (626) 913-9988 Fax

Copyrighted material

Mobo Mania

Today's mobos don't just offer unprecedented performance, they also come with burgeoning accessory bundles and krazee kolors. Here's an in-depth look at the six motherboards that graced our Lab this month

BY GORDON MAH UNG

If you bought a motherboard five years ago, you counted your blessings if it came with a floppy cable, I/O shield, and manual that wasn't a fifth-generation Xerox copy.

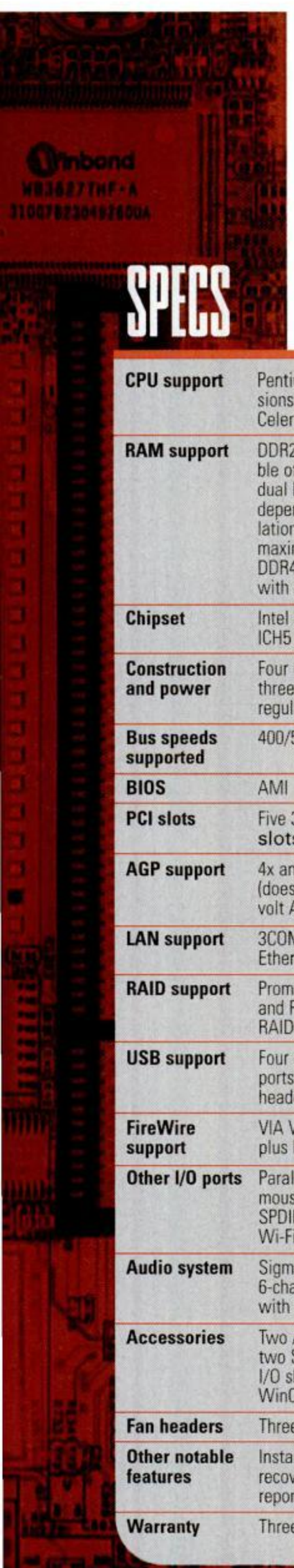
But this just ain't the case today. Motherboards have grown up—they now offer more accessories, more features, and more attention to the overall consumer experience. Today, the *minimum* you'll get is thorough documentation, an I/O shield, and a full set of cables. And on the long end of the stick, you get the kitchen sink and plumbing, too. Today's mobos come with remote controls, media readers, carrying cases, case stickers, and a flourish of colors. Hey, you need those pretty, pretty colors to appeal to hardcore case modders.

If you're questioning whether it's the right time to invest in a new motherboard, we can only say that now is not *too risky* a time to invest—on the Intel side, that is. With Intel's new 800MHz bus (care of the 875P chipset), Pentium 4 motherboards will probably be relevant until 2004, at which point PCI Express will begin forcing a new upgrade cycle. Until that time, the four Intel boards reviewed this month will probably do all your bidding, even if you're running Prescott, Intel's upcoming CPU (due in 4Q this year).

On the AMD side, things are in a bit of disarray. The Athlon 64 processor will arrive this fall, and it's unlikely more speed bins for the Athlon XP will be introduced. Nonetheless, today's fastest Athlon XPs indeed offer much computing power for the money. You just have to choose the right motherboard. The two Athlon XP boards reviewed here revisit the "single-channel RAM versus dual-channel RAM" debate. Read on...

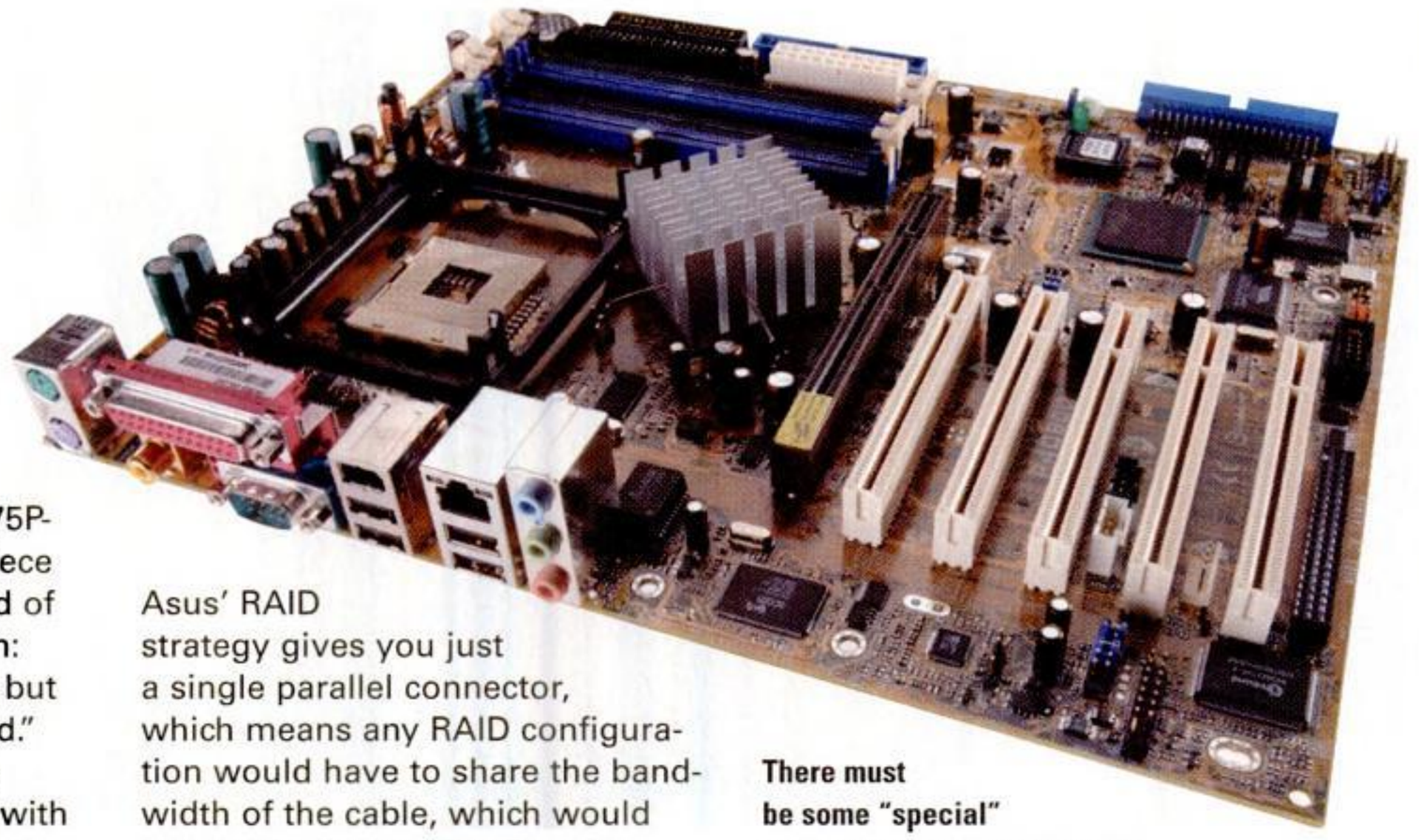
ASUS P4C800 Deluxe

Where did they find all this performance?



SPECS

CPU support	Pentium 4 A/B/C versions; Socket 478 Celerons
RAM support	DDR266/333/400 capable of running single or dual DDR modes depending on the population of DIMM slots; maximum of 4GB; DDR400 possible only with 800MHz FSB CPU
Chipset	Intel 875P northbridge, ICH5 southbridge
Construction and power	Four layer PCB with three-phase power regulation
Bus speeds supported	400/533/800
BIOS	AMI
PCI slots	Five 32-bit, 5-volt PCI slots
AGP support	4x and 8x AGP Pro 50 (does not support 3.3-volt AGP cards)
LAN support	3COM 3C940 Gigabit Ethernet on PCI bus
RAID support	Promise/Marvell Serial and Parallel RAID 0 and RAID 1
USB support	Four onboard USB 2.0 ports, plus two USB 2.0 headers
FireWire support	VIA VT6307 FireWire A plus FireWire header
Other I/O ports	Parallel, serial, PS/2 mouse, PS/2 keyboard, SPDIF out, proprietary Wi-Fi port
Audio system	SigmaTel AD1985 6-channel CODEC with SoundMax
Accessories	Two ATA100 cables, two Serial ATA cables, I/O shield, InterVideo WinCinema
Fan headers	Three
Other notable features	Instant Music, BIOS recovery CD, Voice Post reporter
Warranty	Three years



There must be some "special" technology in this here board, because Asus ran away with the benchmarks.

Next to its fluorescent, feature-packed competitors, it may be easy to dismiss the 875P-based P4C800 Deluxe as a "piece of junk." But like Han Solo said of his beloved Millennium Falcon: "She may not look like much, but she's got it where it counts, kid."

This Asus product conjures images of a 1973 Chevy Nova with a primer paint job and a cracked windshield, but the board truly has it where it counts: in the numbers. The P4C800 astounded us by running away from the competition in almost every benchmark.

But more about performance in the benchmarks section on page 49. For now, let's get into the actual chips soldered onto the Asus PCB. The board is well-configured, but we found some of Asus' component choices to be odd. The P4C800 Deluxe features the new Intel 875P northbridge and the ICH5 southbridge, but doesn't have the RAID-capable ICH5-R. Two Serial ATA ports are supported by the chipset, but Asus added an additional two SATA ports, complements of a Promise/Marvell Serial ATA RAID controller. That gives you support for up to four SATA devices and four parallel IDE devices, *or* support for parallel RAID using the Promise chip. Good design? Maybe, maybe not. Asus' RAID strategy gives you just a single parallel connector, which means any RAID configuration would have to share the bandwidth of the cable, which would hurt performance. The Promise RAID on the PCI bus also limits you to 133MB/s transfers.

Asus also took an odd turn with its implementation of Gigabit Ethernet—the board eschews Intel's CSA feature for a 3Com 3C940 Gig-E chip. CSA promises huge performance increases by moving Ethernet traffic off the PCI bus and onto a special direct port in the memory controller. The 3Com chip on the new Asus board, however, runs off the PCI bus. Asus said its decision is based on the 3Com chip's featured ability to sense when a cable is damaged and *where* it's damaged. Cool. But we'd still prefer CSA support.

In the audio department, Asus uses an Analog Devices AD1985 codec to give you up to six channels of audio. Like the other mobo-bound sound chips here (save the nForce2), the AD1985 is a host-based chip—it relies on your CPU to do any complex audio processing and effects. For host-based solutions, drivers are everything. In this roundup of Intel boards, the SoundMax driver/Sigmatel codec combo actually took the biggest frame rate hit when running *Unreal 2003 Tournament* in audio hardware mode. But it's also the only driver/chip combo that worked in *all* of our audio tests.

Frame-rate hits aside, the Asus was the only board besides the MSI nForce2 board able to complete the *3DMark2003* audio test.

Asus also features a unique "instant music" mode that lets you cue an audio CD in the drive to play the second the machine POSTS. It's gimmicky, but we assume someone's going to like it. Oddly, Asus includes only three audio jacks on the board, which is lacking an audio bracket. This means you'll lose the line-in and mic-in if you run an analog 5.1 system.

We may sound a little critical of the Asus board's configuration, but there's no denying that its scores rocked the competition. We attribute some of the performance boosts to a slight default overclock (the board runs the 3.00GHz P4C at 3030MHz), but we don't think the OC can totally account for the board's lead.

When we shared our numbers with Asus, the company couldn't explain its dominance, except to say that it did push the BIOS design to get as much performance out of the board as possible. Maybe like Han Solo, Asus made some "special modifications" that its competitors have yet to figure out.

VERDICT 9

$200

P4C800 Deluxe, www.asus.com

STAR WARS

Highest benchmarks of the roundup, except in audio tests.

THE PHANTOM MENACE

As visually exciting as a Chevy Citation, sparse on audio jacks, suffers some design quirks.

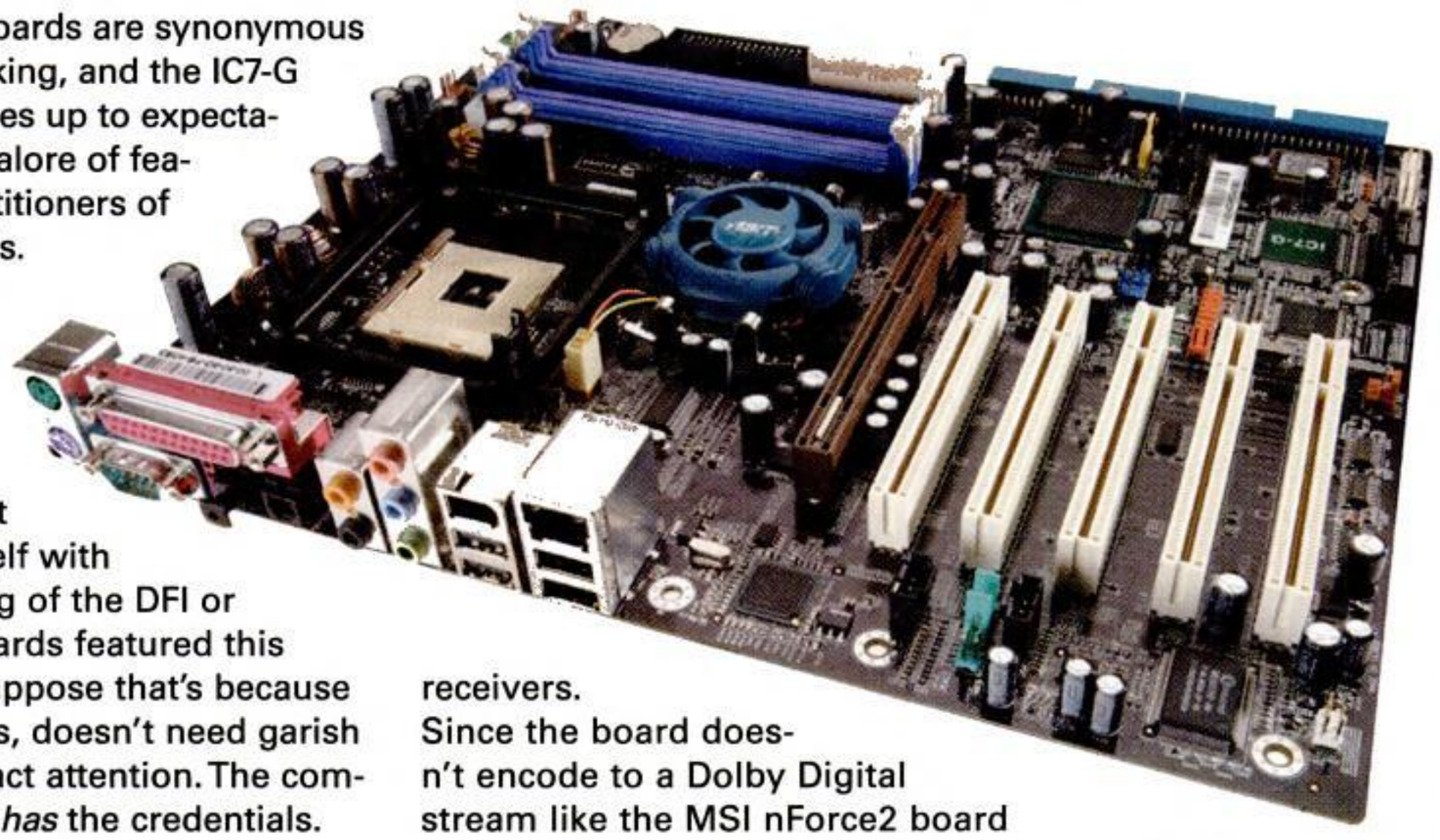
Copyrighted material

ABIT IC7-G

Our pick for best overclocker

Abit features dual-RAID capability care of onboard Intel RAID, and a Silicon Image 3112 controller for both RAID 0 and RAID 1.

Abit's IC7-G exposes AGP-to-PCI ratios and CPU-to-RAM ratios—among other overclocking favorites.



Abit motherboards are synonymous with overclocking, and the IC7-G Intel board lives up to expectations with a galore of features for practitioners of the dirty deeds.

Physically, the board isn't as bland as the Asus P4C800, but it also doesn't announce itself with the bling-bling of the DFI or Chaintech boards featured this month. We suppose that's because Abit, like Asus, doesn't need garish colors to attract attention. The company already *has* the credentials.

The IC7-G doesn't stray too far from the Intel parts bin. There's the 875P northbridge, and the ICH5-R southbridge with RAID support. For Ethernet support, Abit uses Intel's Pro/1000 chip, which is plumbed directly to the northbridge for better Gig-E performance. Although this strategy isn't as technologically innovative as the Asus' artificially intelligent LAN feature, the promise of better performance is worth the trade-off in the long run.

Unlike the Asus board, the IC7-G includes a full complement of audio I/O jacks that will let you run onboard six-channel audio in analog mode, as well as connect line-in and mic-in devices, all simultaneously. Abit also includes a pair of optical I/O ports. The ports are useful for MiniDisc owners, but don't configure well with Dolby Digital receivers.

Since the board doesn't encode to a Dolby Digital stream like the MSI nForce2 board in this month's roundup, you won't be able to play games in surround sound when running the board in optical mode with a decoder box. It's possible the ports will be useful if RealTek adopts a host-based encoding solution like C-Media, but until then, the optical I/O ports are suited for MiniDisc users only.

The IC7-G doesn't come with a lot of extras like the DFI and Chaintech boards, but we did find the inclusion of a PATA-to-SATA data converter to be a value-add. By inserting the converter into an older parallel ATA optical or hard drive, you can run the device off one of the SATA ports on the mobo.

During testing, the IC7-G was just edged by the Chaintech 9JCS Zenith, but you had to squint to see performance differences among the 875P boards (save the Asus, of course). In testing the impact of onboard audio processing on gaming frame rates, Abit's RealTek solution turned in the highest scores in *Unreal Tournament 2003* when audio was set to 3D hardware support. Oddly, *3DMark2003's* audio test wouldn't function with the board's drivers.

What Abit mostly brings to the table is overclocking features. While all four P4 boards here are capable overclockers—letting you perform FSB and voltage tweaks—the IC7-G had the most options for AGP-to-PCI ratios, CPU-to-RAM ratios, and manual settings of AGP/PCI speeds. Overclocking headroom on the mobo level wasn't a criteria for our tests (because individual CPUs greatly impact overclocking), but the IC7-G will clearly give OCers more flexibility in massaging CPU speeds.

The Abit board is caught in a tough position. It doesn't have the sex appeal of the DFI and Chaintech boards, and it doesn't turn in the benchmark scores of the Asus board. Still, we think for people who are primarily concerned with overclocking, the IC7-G is the logical choice—especially at just $150.

VERDICT 9 $150

IC7-G, www.abit.com.tw

OVERCLOCKING

Good price and awesome overclocking features.

OVERDOSING

Visually blah, and not the top performer.

SPECS

CPU support	Pentium 4 A/B/C versions; Socket 478 Celerons
RAM support	DDR266/333/400 capable of running single or dual DDR modes depending on the population of DIMM slots; maximum of 4GB; DDR400 possible only with 800MHz FSB CPU
Chipset	Intel 875P northbridge, ICH5-R southbridge
Construction and power	Four-layer PCB with four-phase power regulation
BIOS	Award
Bus speeds supported	400/533/800
PCI slots	Five 32-bit, 5-volt PCI
AGP support	4x and 8x AGP Pro 50 (does not support 3.3-volt AGP cards)
LAN support	Intel 82547E Gigabit Ethernet using CSA port in northbridge
RAID support	Intel integrated ICH5-R RAID 0 plus Silicon Image 3112 Serial RAID 0 and 0+1
USB support	Four USB 2.0, plus two USB 2.0 headers
FireWire support	Texas Instruments TSB43AB23 FireWire A plus two FireWire headers
Other I/O ports	Parallel, serial, PS/2 mouse, PS/2 keyboard, Optical SPDIF I/O
Audio system	RealTek ALC650 6-channel AC97
Accessories	Rear panel bracket with two USB 2.0 and two FireWire A ports, one rounded PATA cable, one rounded floppy cable, two SATA data cables, two SATA power converter cables, one PATA-to-SATA data converter, I/O shield
Fan headers	Four
Other notable features	Includes PATA-to-SATA converter with hot-swapping support, highly overclockable BIOS
Warranty	Three years (last year requires $25 repair/replacement fee)

Copyrighted material

Chaintech 9JCS Zenith

Get a new motherboard *and* a kitchen sink

MAXIMUM PC KICK ASS PRODUCT

Chaintech took the Ginsu knife approach with its 875P motherboard bundle: You not only get the motherboard. You get a screwdriver, SATA data cables, and SATA power cables too. And, wait, there's more: A full set of rounded parallel ATA cables, a bay-mounted media reader, and front-mounted USB and FireWire ports.

And if you order now, you also get an infrared remote control and an LED readout that displays the POST codes as you boot! *Whew.*

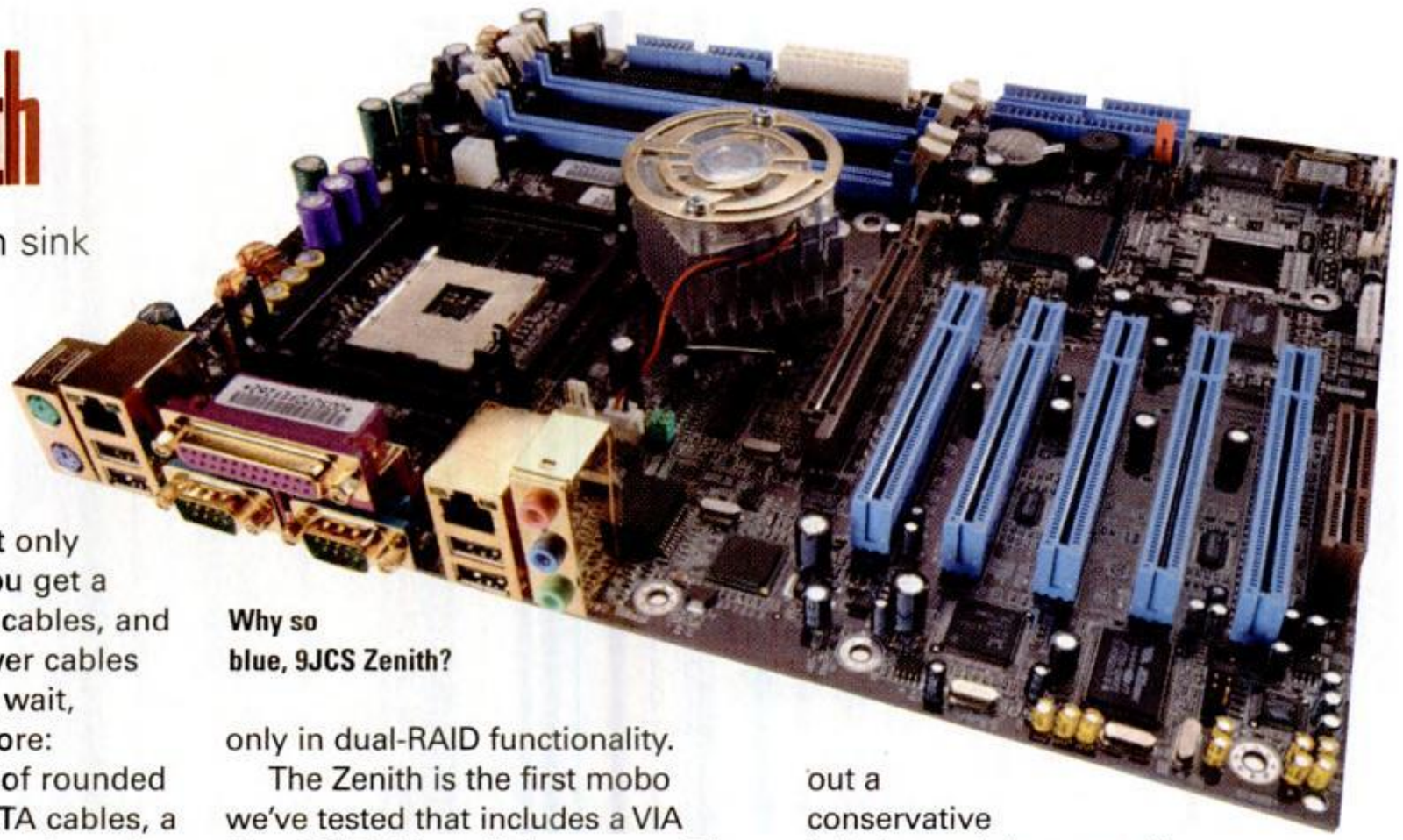
Like the other three P4 boards reviewed this month, there's the full 875P chipset with the ICH5-R southbridge for RAID support. Chaintech includes support for Intel's CSA LAN, and for good measure throws in a RealTek Fast Ethernet controller. This dual-LAN arrangement gives you the ability to run the board as a router without having to add any PCI cards. And how's this for features? Chaintech actually ran out of room on the board, so it added a small daughterboard bearing additional audio jacks, an optical SPDIF out, and two FireWire ports. Compared with our other contenders, the 9JCS Zenith is lacking only in dual-RAID functionality.

The Zenith is the first mobo we've tested that includes a VIA Envy24PT chip, which supports 24-bit audio. Don't assume you're getting a full DSP, though, because the Envy24PT is a host-based solution. What's more, while the VIA chip may sport 24-bit capability, Chaintech limits the Envy24PT by using a VIA VT1616 codec. This codec supports six audio streams, but is limited to 18-bit support only! Still, on the plus side, the VT1616 codec features a separate circuit that helps cut down hiss.

We were confused by the audio drivers Chaintech included. Once the initial drivers were installed, we were unable to tweak environments or change the speaker setup. Also, of the three P4 boards we tested, only the Zenith was unable to run *Unreal Tournament 2003* when 3D audio hardware was enabled. It didn't run the *3DMark2003's* audio test either, but then again, the Asus and the MSI were the only two boards that did.

Performance-wise, the Chaintech was a bit faster than the Abit IC7-G board. Of course, this month's vendors did play with bus speeds for modest CPU overclocks. The 3GHz CPU was overclocked the most by Chaintech—up to 3,043MHz. The Asus was second at 3,030MHz; Abit rang in at 3,007MHz; and DFI turned out a conservative (albeit possibly more reliable) 2,995MHz.

Chaintech wants you to shell out $269 for its board. The street price will likely be lower, but that's a pretty penny for a motherboard, even if it is a six-layer design. Worse still, the Chaintech features the shortest warranty period (just two years) of all the boards in the roundup. Nonetheless, we love the "give 'em everything" approach, and considering the board's solid performance, we doubt you could want much more from an 875P mobo.



Why so blue, 9JCS Zenith?

Chaintech includes every extra anyone could ever think of.

SPECS

CPU support	Pentium 4 A/B/C versions; Socket 478 Celerons
RAM support	DDR266/333/400 capable of running single or dual DDR modes depending on the population of DIMM slots; maximum of 4GB; DDR400 possible only with 800MHz FSB CPU
Chipset	Intel 875P northbridge, ICH5-R southbridge
Construction and power	Six-layer PCB with three-phase power regulation
BIOS	Award
Bus speeds supported	400/533/800
PCI slots	Five 32-bit, 5-volt PCI slots
AGP support	4x and 8x AGP (does not support 3.3-volt AGP cards)
LAN support	Intel 82547E Gigabit Ethernet using CSA port in northbridge and Real Tek RTL8101L Fast Ethernet port
RAID support	Intel integrated ICH5-R RAID 0
USB support	Four USB 2.0 ports on board, two on bay, two USB 2.0 headers on motherboard
FireWire support	Two FireWire A ports on CMR card
Other I/O ports	One parallel, two serial, one PS/2 keyboard, one PS/2 mouse
Audio system	Envy24PT and VIA VT1616
Accessories	CBox3 with white, black and silver bezel, screwdriver, two rounded PATA cables, one rounded floppy cable, IR remote control, two SATA data cables, two SATA power conversion cables, I/O shield
Fan headers	Two
Other notable features	First board we've seen with native 24-bit audio; spectacular bundle
Warranty	Two years

VERDICT 9

$269

9JCS Zenith, www.chaintech.com.tw

FOREMAN GRILL

Fast, packed, and stacked with features

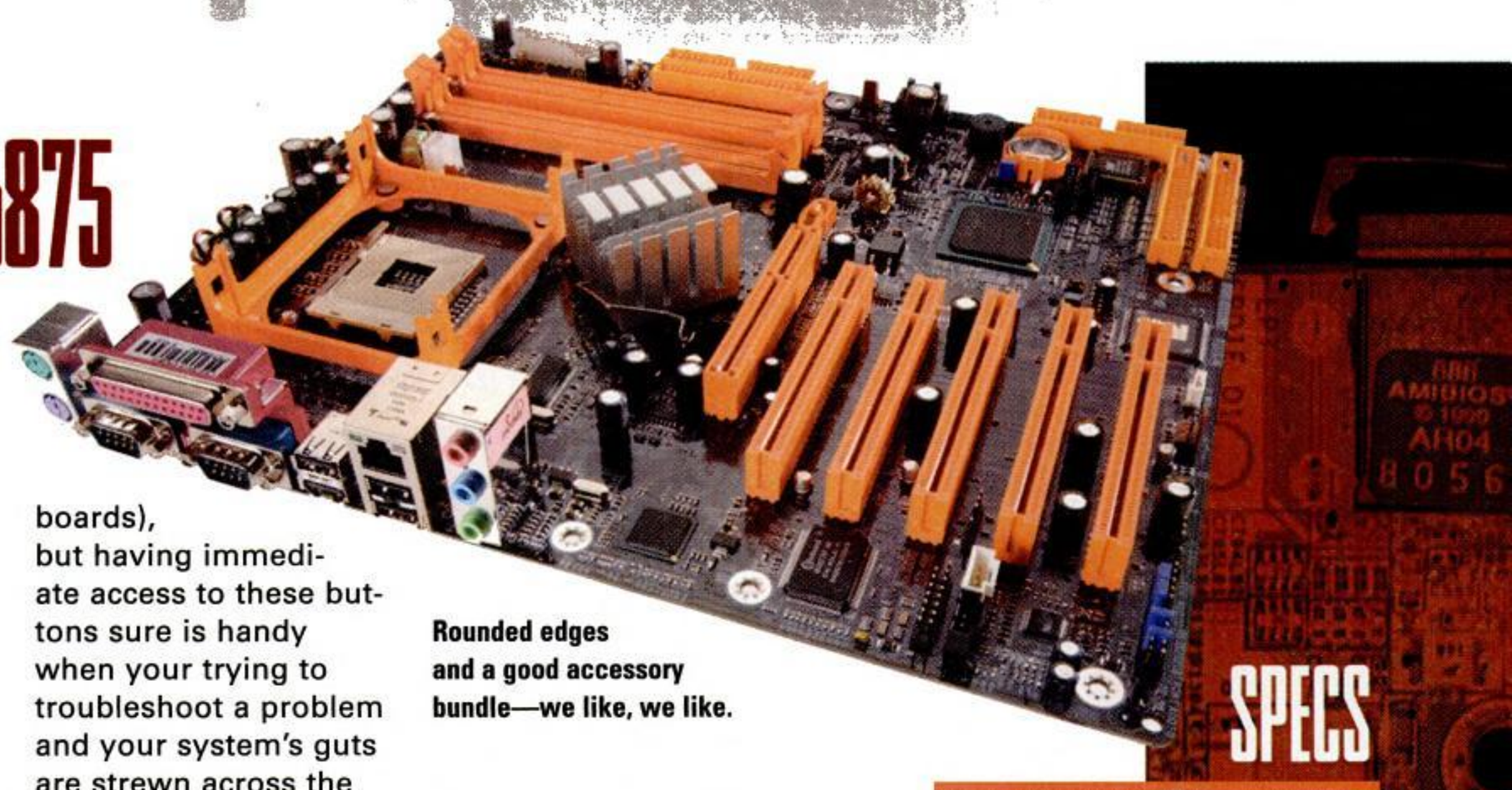
FLOWBIE

Expensive, strange audio choices, and we're not big fans of baby blue.

Copyrighted material

DFI LAN Party Pro875

Fluorescent colors scream, "Put me in a case window!"



Rounded edges and a good accessory bundle—we like, we like.

Sporting radioactive-looking orange components that fluoresce under ultraviolet light, the Pro875 is a departure from DFI's sedate leanings.

Like the Chaintech Zenith series, DFI's LAN Party series packs in the accessories. Included in the box are a FrontX bay with customizable USB and audio ports; a set of rounded cables; a carrying case that looks like it was made by Case ACE; and even a bit of thermal paste and a case sticker.

DFI doesn't stray far from the Intel reference design. The 875P northbridge is present and accounted for, as is the ICH5-R southbridge and Gig-E support through CSA. The DFI board, unlike the others in this roundup, can also do "1.5" RAID. Using a High Point 372N chip, the DFI lets you set up a RAID array that uses both striping and mirroring, with just *two* hard drives. This feature works via the board's parallel ATA connections, though, so you can forget about using the onboard Serial ATA controller for this feature.

A carrying case, bay adapter, and cables make a nice bundle.

DFI embedded power and reset buttons directly on the PCB. This isn't new to the world of mobos (Abit did it with its 845PE series boards), but having immediate access to these buttons sure is handy when your trying to troubleshoot a problem and your system's guts are strewn across the table. Like the Chaintech 9CJS, the DFI board gives you visual POST codes, but you have to translate them from four LED's on the PCB surface using a table in the manual.

On the audio front, DFI uses a C-Media six-channel codec capable of 18- to 20-bit quality signals. The board's audio performance was slightly inferior to that of the Abit board, but definitely better than what the Asus mustered. DFI didn't include the optional Dolby Digital encoder from C-Media that would let you run the board with a digital decoder box, but because the board is intended for use in gaming rigs, we won't be too finicky about that omission.

During benchmark battles, the DFI slightly trailed the Abit and Chaintech boards (and of course, the mighty, mighty Asus). We attribute this to the board's conservative stock clock-speed. Running a 3GHz P4, the LAN Party Pro875 ticks along at 2,995MHz. It's also pretty clear that BIOS optimizations for the new 875P chipset have some wiggle room. Running the latest public BIOS, the LAN Party Pro875 performed like a slower 865PE board. A newer, beta BIOS that DFI provided brought the performance to within a few percentage point of the other 875P boards here (not including the mysteriously fast Asus board, of course).

If DFI wants to spice up its image, it's off to a good start. Its orange radiance is more to our liking than the Chaintech's baby blue, and while the LAN Party Pro875 was last in terms of performance, it was still very close to the other two "normal" 875P motherboards here. We just can't forgive the lack of FireWire support, which is requisite in any enthusiast-level board. All in all, the DFI is just a good board in a tough field of competitors.

VERDICT 8

$219

LAN Party Pro875, www.dfi.com.tw

ORANGINA

Cool color, good accessory bundle, and unique RAID "1.5" feature.

CITRICIDE

Lacks FireWire, and stock system bus speeds are a little more conservative than the other three.

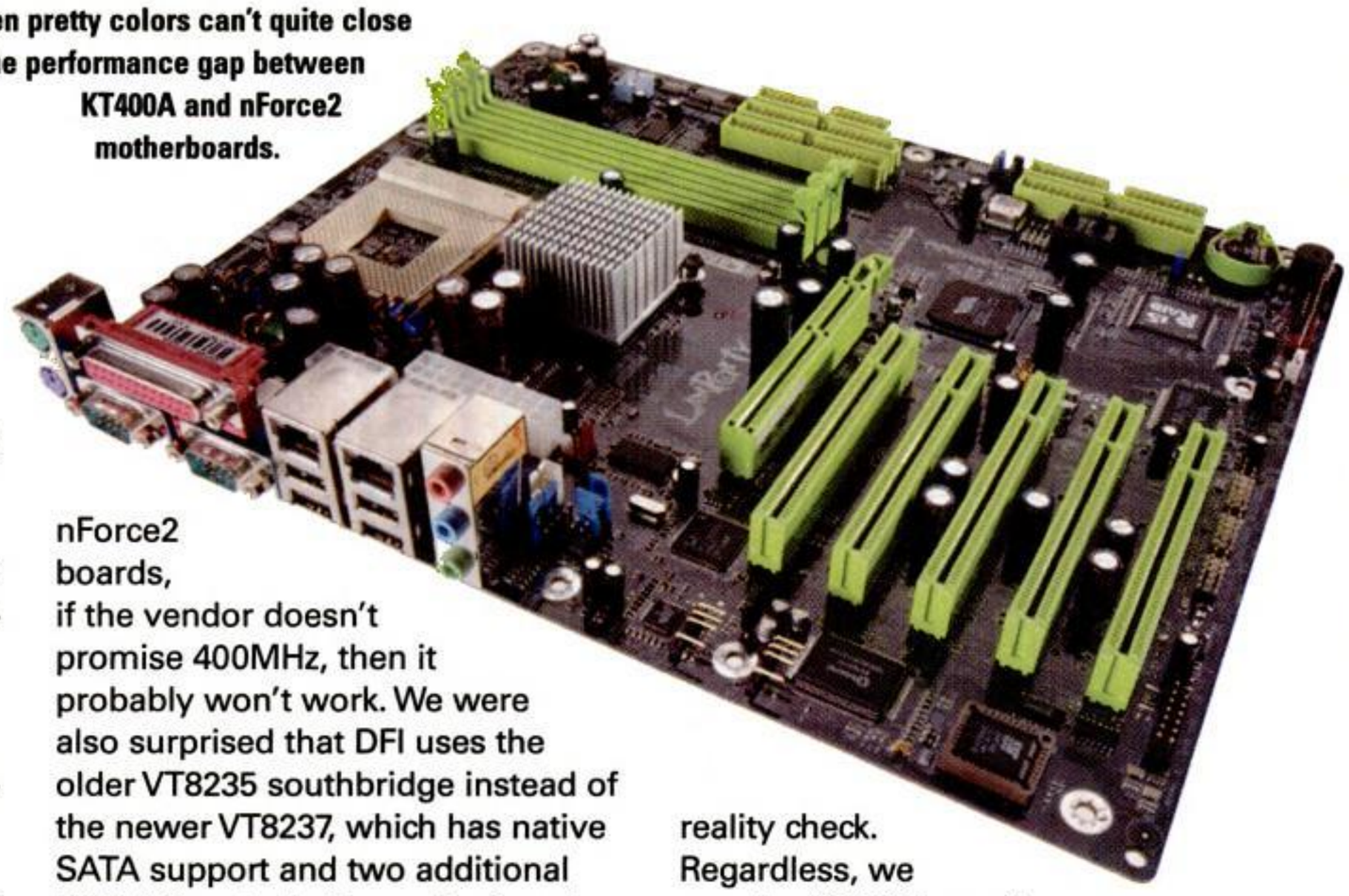
SPECS

CPU support	Pentium 4 A/B/C versions; Socket 478 Celerons
RAM support	DDR266/333/400 capable of running single or dual DDR modes depending on the population of DIMM slots; maximum of 4GB; DDR400 only possible with 800MHz FSB CPU
Chipset	Intel 875P northbridge, ICH5-R southbridge
Construction and power	Four-layer PCB with three-phase power regulation
BIOS	Award
Bus speeds supported	400/533/800
PCI slots	Five 32-bit, 5-volt PCI slots
AGP support	4x and 8x AGP (does not support 3.3-volt AGP cards)
LAN support	Intel 82547E Gigabit Ethernet using CSA port in northbridge
RAID support	Intel integrated ICH5-R RAID 0 plus High Point 372N RAID 0, RAID 0+1, RAID 1.5
USB support	Four USB 2.0, two USB 2.0 headers
FireWire support	None
Other I/O ports	Game port, coax SPDIF I/O, parallel, serial, PS/2
Audio system	C-Media CMI9739A codec supports six-channel audio
Accessories	Two rounded PATA cables; one rounded floppy cable; two SATA data cables; two SATA power conversion cables; FrontX bay with two audio ports and two USB ports; coax SPDIF I/O rear panel bracket; game port rear panel bracket; I/O shield; CPU thermal grease; PC Transpo carrying strap; sticker
Fan headers	Three
Other notable features	Fluorescent board components
Warranty	Three years

Copyrighted material

DFI LAN Party KT400A

Nice bundle, but no match for hardier silicon



Even pretty colors can't quite close the performance gap between KT400A and nForce2 motherboards.

When we compared the VIA KT400A and nVidia nForce2 chipsets a few months ago, we determined that single-channel memory chipsets like the VIA still offered enough performance to be relevant to Athlon XP users. DFI must have reached the same conclusion, because it has applied its wild-and-crazy case-modding shtick to VIA's chipset platform to make the LAN Party KT400A. Like the LAN Party Pro875, this board is a head-turner, with green PCI, IDE, and memory slots that fluoresce under UV light.

For this board, DFI complemented the offerings hardwired into the KT400A chipset with a ton of features: dual Fast Ethernet ports, FireWire via a VIA VT6306 chip, and embedded power and reset switches—all on a black PCB. There's also a party bag of accessories, including a carrying strap for a completed PC, rounded cables, and a FrontX bay adapter with FireWire, USB, and audio ports.

Instead of setting frontside bus speeds in the BIOS, you have to flip DIP switches. The board has bus settings from 200MHz to 400MHz, but DFI isn't guaranteeing anything beyond 333MHz. Will you be able to get 400MHz from the DFI? If past experience is an indicator, good **luck. As** many people **have** discovered **with** nForce2 boards, if the vendor doesn't promise 400MHz, then it probably won't work. We were also surprised that DFI uses the older VT8235 southbridge instead of the newer VT8237, which has native SATA support and two additional USB 2.0 ports. In the audio department, DFI uses the same C-Media six-channel codec that's in the DFI Pro875 board.

Just like DFI's P4 LAN Party board, the KT400A version features a High Point 372N controller with support for RAID "1.5." We set up a RAID 1.5 configuration using a pair of parallel ATA drives, and then removed one drive to see if the single remaining drive would reappear as whole, as promised. The board automatically recovered the second drive and we were up and running—a RAID 1 victory! Of course, it's debatable whether a RAID 1.5 array really provides all the performance of RAID 0. In our quick-and-dirty tests, we saw a minor performance bump when running both drives, but more testing is necessary before we declare RAID 1.5 a smashing success.

But the real question is memory performance, isn't it? The VIA KT400A chipset gave a good showing three months ago, but at that time we were pitting an engineering sample supplied directly by VIA against a production-level nForce2 motherboard. This month, VIA's chippie didn't fare as well. Just compare the LAN **Party KT400A's** performance with **that of the MSI** board **on page** 47. One **can only** assume that our engineering **sam**ple was tuned for max performance, while DFI's shipping board is a big, fat honking reality check. Regardless, we saw the KT400A run its fastest when its RAM was clocked asynchronously at DDR400 speeds, while the nForce2 board did its best when its RAM was synchronized with the CPU's FSB speed.

The LAN Party KT400A's accessories are top-notch, but we can only recommend this board to the most virulent nVidia haters who simply refuse to run n-*anything* silicon. No matter how you cut it, the KT400A in production trim falls flat. DFI now makes an nForce2 version of the LAN Party, so maybe this board is the answer.

You get a carrying strap for your PC, a FrontX bay, a crapload of cables, and even a case sticker.

SPECS

CPU support	266MHz and 333MHz Athlons, Athlon XPs and Durons (overclocking support for 400MHz)
RAM support	Single-channel DDR266, DDR333, DDR400; maximum of 3GB
Chipset	VIA Apollo KT400A northbridge, VIA VT8235 southbridge
Construction and power	Four-layer with three-phase power regulation
BIOS	Award
Bus speeds supported	200/266/333
PCI slots	Five 32-bit, 5-volt PCI slots
AGP support	4x, 8x AGP
LAN support	VIA VT6103 Fast Ethernet and Realtek 810IL Fast Ethernet
RAID support	High Point 372N RAID 0, RAID 0+1, RAID 1.5
USB support	Four USB 2.0 ports
FireWire support	VIA VT6306 FireWire A controller with three FireWire headers on the PCB
Other I/O ports	Game port header, SPDIF header, Marvell SATA controller with one port
Audio system	C-Media CMI9739A codec supports six-channel audio
Accessories	FrontX bay adapter with FireWire, two USB, two audio ports; game port rear panel bracket; SPDIF I/O rear panel bracket; I/O shield; SATA power converter cable; SATA data cable; PC Transpo carrying strap; thermal grease; sticker; two rounded PATA cables; one rounded floppy cable
Fan headers	Three
Other notable features	Rounded corner PCB; green UV sensitive components
Warranty	Three years

VERDICT 6 $160

LAN Party KT400A, www.dfi.com.tw

FAT

DFI knows how to accessorize, snap!

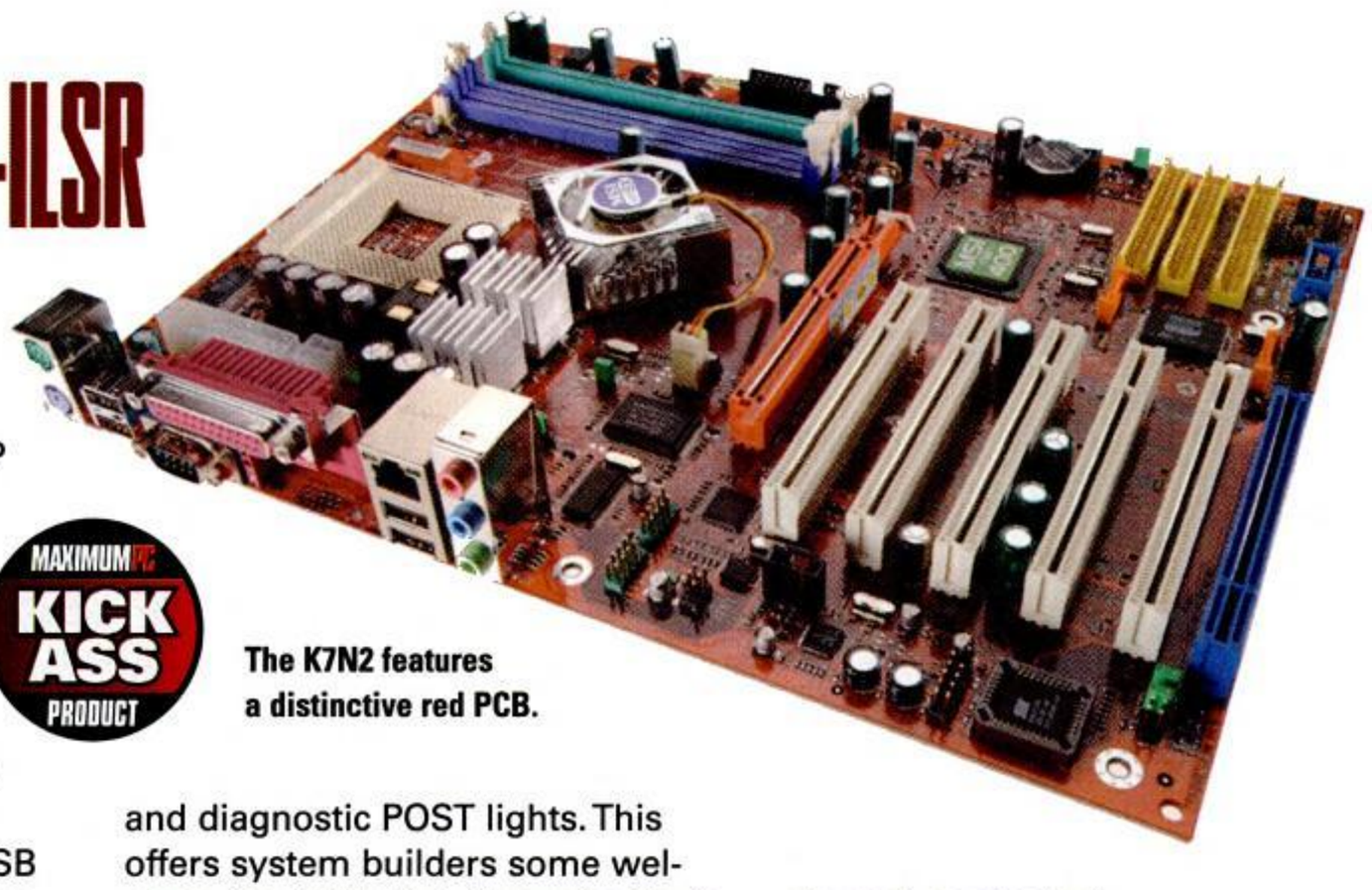
OLESTRA

The KT400A ain't an nForce2, and what's up with the damned jumpers?

Copyrighted material

MSI K7N2 Delta-ILSR

Grab the Ultra, enjoy the headroom



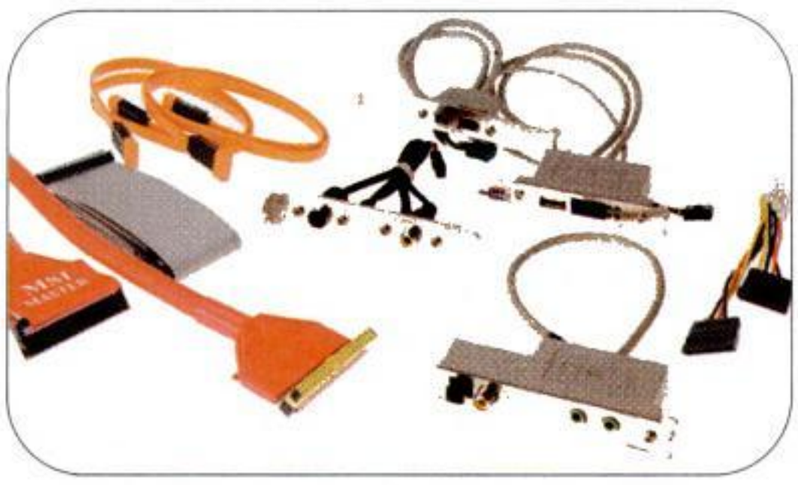
The K7N2 features a distinctive red PCB.

When configuring an Athlon XP system, there's really only one chipset choice these days: nForce2. It's got the performance and the features, so what else could you ask for? A crazy red PCB? The MSI K7N2 Delta-ILSR has that, too—along with fully declared support for 400MHz FSB Athlon XPs. Not bad, considering that many first-generation nForce2 chipsets won't work at 400MHz.

In fact, this new MSI board features nVidia's new nForce2 "Ultra 400" chipset. Besides offering official 400MHz bus support, the Ultra 400 can theoretically be clocked even farther, though how far depends on your system's CPU, RAM, and power supply. Still, for overclockers, the Ultra is the label to look for.

The board sports MSI's trademark crimson finish and an interesting assortment of PlaySkool-colored connectors. The I/O options are nice for an Athlon board, but seem average compared with the Intel 875P boards' offerings. There's a Promise Serial ATA RAID chip, an onboard Fast Ethernet port (care of the nVidia MCP2-T southbridge), and two FireWire A headers. Instead of jamming up its I/O shield with sundry ports, MSI provides several rear-panel brackets for USB, FireWire, and diagnostic POST lights. This offers system builders some welcome flexibility, but if you decide to install all three rear-panel brackets, you'll need to give up three slots in the back of your rig.

The board has full nVidia SoundStorm certification, which means it can encode Dolby Digital 5.1 in real-time, and spit it out through the optical or coax SPDIF.



The K7N2 Delta-ILSR relies on rear-panel brackets to give you access to options.

An ALC650 20-bit codec handles analog output. As for testing the sound chip's impact on gaming frame rates, we couldn't compare this MSI board with the 875P motherboards (that would be apples to oranges), but we did compare MSI's onboard sound with a Sound Blaster Audigy 2. The verdict: the nForce2 does run just as fast as the Audigy 2 in a pure frame rate battle (and sometimes a bit faster, depending on the test).

As for pure core-system performance, we saw the K7N2 Delta-ILSR outperform the DFI LAN Party KT400A in just about every test. Consider this a ringing endorsement for the dual-channel memory controller in the nForce2 (the KT400A uses just a single-channel controller). Will VIA's upcoming KT600 be able to even the score? Perhaps, but by the time this chipset arrives (possibly by the time you read this), it may be too late. Regardless, the KT600 is slated to offer 400MHz bus support as well as native Serial ATA support in the southbridge.

We love this MSI mobo, but our review unit lacked one necessary component: a badge proudly declaring that an nForce2 Ultra 400 was soldered to the PCB. The regular nForce2 and Ultra 400 are pretty much identical, but the "Ultra" badge denotes faster bus speeds, so you'll want to make sure the board you buy has the goods (MSI told us our review unit was sent in old packaging). We'd be shocked if AMD introduced faster bus speeds for the Athlon XP, but overclockers will surely want all the headroom that the Ultra can offer.

VERDICT 9 $150

K7N2 Delta-ILSR, www.msicomputer.com

MATRIX

Sexy PCB and dual-channel memory. Six-layer design is good for bragging rights.

MATRIX RELOADED

Relies too heavily on rear-panel brackets, and let's face it, even the nForce2 doesn't match the power of the 875P.

SPECS

CPU support	200MHz, 266MHz, 333MHz, 400MHz Athlon, Athlon XP and Duron CPUs
RAM support	DDR200, DDR266, DDR333, DDR400; dual or single modes depending on DIMMs installed; maximum of 3GB
Chipset	nForce2 Ultra 400 SPP Northbridge, MCP-T southbridge
Construction and power	Six-layer PCB, four-phase power regulation
BIOS	Award
Bus speeds supported	200/266/333/400
PCI slots	Five 32-bit, 5-volt PCI slots
AGP support	4x and 8x AGP
LAN support	nVidia Fast Ethernet in MCP-T
RAID support	Promise PDC20376 supports two SATA and one PATA
USB support	Four USB 2.0, one USB header on PCB
FireWire support	Two FireWire A headers on PCB
Other I/O ports	ACR slot, parallel, serial
Audio system	nVidia MCP-T south bridge supports real-time Dolby Digital encoding and RealTek ALC650 six-channel 18 or 20-bit CODEC
Accessories	S-bracket rear-panel bracket with optical SPDIF, coax SPDIF, two audio out ports; D-bracket2 rear-panel bracket with POST LEDs, USB port; rear-panel bracket with six-pin FireWire A and four-pin FireWire A ports; two SATA data cables; power converter cable for two SATA drives; one rounded PATA cable.
Fan headers	One
Other notable features	Both optical and coax SPDIF audio out
Warranty	Three years

Copyrighted material

Chipset Cheat Sheet

Who knows, maybe the motherboard you're planning to buy isn't in this month's roundup. Shoot, you may not even know which class of motherboard is best for you. The mobo decision can't be resolved until you pick your core-logic chipset, so here's a quick rundown of what's available now and on the horizon.

INTEL

INTEL 865 SERIES

Intel's mainstream chipset comes in three versions: the integrated graphics version called the 865G, the bus-limited version called the 865P, and the real deal—the 865PE. With performance pretty close to the 875P, the 865PE is a true performer for the money. Motherboard vendors have already hacked it to give it 875P-like performance (see the article below for more details). All in the 865 series support dual-channel DDR RAM, but only the 865PE and the 865G support the 800MHz bus.

INTEL 875P

Intel's performance chipset brings 800MHz bus performance to the table, as well as native Serial ATA support and a special networking port to increase Gigabit LAN speeds. The use of dual-channel DDR400 RAM sends RDRAM to the dust bin. Motherboard designs may have to be adjusted, but Intel says the 875P will fully support the upcoming Prescott CPU later this year. The 875P is the chipset to beat, and will likely endure until Intel's next-generation chipset code-named Grantsdale—with PCI Express and DDR-II support—is rolled out next year.

VIA PT600

Intel has now given VIA its blessing to build chipsets for the P4. The P4X400's single-channel DDR support has mostly been a non-starter in popularity, but for next year VIA reportedly plans to introduce the PT600 chipset, which supports 800MHz bus speeds and dual-channel DDR. A follow-up called the PT800 would add DDR-II support.

ATI RADEON 9100 IGP

Integrated-graphics capability hasn't been too exciting, but ATI's new Radeon 9100 IGP will include pixel and vertex support as well as dual-channel DDR400 and full bus-speed support for the P4.

SIS 655FX

SiS' 655FX is expected to add 800MHz bus support to the dual-channel 655 chipset. Also expected in the 655FX is full DDR400 RAM support. SiS has more or less done well in the P4 market (thanks to VIA's legal woes with Intel), but has been slipping of late. Its RDRAM chipset, the R658, was a stinker. Later this year, SiS plans to introduce a quad-channel RDRAM chipset.

AMD

SIS 748

It may surprise many, but SiS *does* make Athlon XP chipsets. The SiS 748 is a single-channel DDR400 jobbie with full 400MHz bus support. You rarely see reviews of SiS 748-equipped mobos, because the chipset is typically relegated to budget boards that enthusiasts don't get excited about.

NFORCE2 ULTRA 400

nVidia's dual-channel DDR nForce2 is still the chipset for Athlon XP rigs. The Ultra 400 brings official 400MHz bus support and the promise of easy overclocking. A non-Ultra version won't have the overclocking support and will shed one of the memory controllers, but it will still offer 400MHz bus support.

KT400A

VIA lost some Athlon XP steam after having success with the KT266A, KT333, and KT400 chipsets. The KT400A doesn't support 400MHz CPUs officially, but VIA plans to address that with the KT600, reportedly slated for this summer. With little room left this year before the release of the Athlon 64, VIA is ending on a down note.

Intel 865PE vs. Intel 875P

You'll never believe what goes into Intel's new "budget" part!

For any given bus speed and CPU combo, Intel usually offers two chipset flavors: one for the high-performance crowd and another for the mainstream. With the Pentium III, you had the 815 and the 820. With the 400MHz and 533MHz bus versions of the Pentium 4, you have the 850 and the 845.

For its 800MHz bus P4s, Intel is counterbalancing the 875P performance chipset with the more humble 865 series. There are actually three versions of the 865 chipset, but only two are worth a damn. The first good one is the 865G, which features integrated graphics. The second favorable part is the 865PE. A third version, the 865P, doesn't officially support 800MHz bus CPUs and should be avoided, as it limits your upgrades. All three chipsets support dual-channel DDR, though the 865P supports only DDR333, while the other two support DDR400.

We tested the budget 865PE against the high-end 875P by pitting an Intel D865PERL motherboard against an Intel D875PBZ board. With the same components, drivers, and tests, we ran down the numbers to see if the 865PE is a worthy chipset alternative.

The verdict: Intel's new "budget" chipset offers up a surprising amount of performance. So close, in fact, that some may consider passing up the 875P for the 865PE. The 875P maintained its dominance in memory-bandwidth-intensive tasks, and was clearly ahead in *Quake III, 3DMark2001,* and the synthetic *SiSoft Sandra 2003*. But in many other tasks, the performance of the chipsets was awfully close.

So why the amazing similarities? Well, the chipsets share more than just the Intel name. Intel freely confessed to *Maximum PC* that the 875P and 865PE start as the same chipset. When the dies are tested for speed tolerance at the factory, the faster ones are relegated to the 875P bin, and the slower ones become 865PEs. The 865PEs lose their support for error correcting RAM, as well as their ability to enable Performance Acceleration Technology, which Intel touts as the secret sauce that makes the 875 go faster.

But where there's a will, there's a way: Motherboard vendors are already playing with BIOS and hardware hacks that enable PAT in the 865PE, making it nearly as fast as the 875P. It remains to be seen how Intel will respond to the hacks, but the right 865PE board just may be as fast as its more expensive cousin.

Copyrighted material

Maximum PC: Benchmarks 'R' Us

For performance testing, all six boards were outfitted with an ATI Radeon 9700 Pro (Catalyst 3.1 drivers); two 256MB Corsair Micro DDR400 modules; a Western Digital WD1200JB hard drive; a PC Power and Cooling Silencer 400 PSU; and WinXP Pro. For compatibility testing, all six boards got the same videocard, hard drive, and PSU, plus 2GB of 512MB Corsair Micro DDR400 modules (1.5GB for AMD boards); a Sound Blaster Audigy 2; a 3Com 3C905B NIC; an ATI TV Wonder; and an Adaptec 39160 SCSI controller. Every board handled this full complement of gear with flying colors.

Take a look at the benchmarks of the four 875P motherboards—you'd probably pick the Asus P4C800 Deluxe, right? The board was definitely fastest during testing, but we couldn't ascertain where all the speed came from (and Asus couldn't tell us). Plus, we know from experience that shipping boards are sometimes "detuned" for stability's sake. Will your Asus board perform the same? Only time will tell.

It's also possible that Asus found a secret weapon in its BIOS settings, which can make or break mobo performance. Take the DFI LAN Party board, for example. Initially, it performed like an 865PE board, but when we ran it with an updated BIOS, performance pepped up.

Hey, whatever. No one can deny that the Asus led the pack, performing tops in *Quake III*, *SiSoft Sandra 2003*, *3DMark2001 SE*, and *UT 2003*. However, the Chaintech 9JCS Zenith did edge the Asus board in *SYSmark2002*. We suspect that slightly higher clocks speeds may have contributed to the win. Also, the Asus board's onboard sound solution, SoundMax, had the most grievous impact on gaming frame rates.

So which of the 875P boards takes the cake? It really depends on whether you're into sober packaging (Abit and Asus) or bling-bling (DFI and Chaintech). In the old-school category, we give the edge to Asus, despite the fact that Abit offers more compelling overclocking controls. In the battle of the bling, Chaintech's slightly faster numbers and richer configuration give it the upper hand. If only we had more mad love for those baby-blue connectors.

In AMD land, there wasn't any contest. Even if you merely squint at the benchmark table, it's obvious that the nForce2-prepped MSI mobo was the performance leader in every category. VIA helped make the Athlon and Athlon XP with its KT-series of chipsets, so it's a letdown to see the company trail so far behind upstart nVidia.

The KT600 chipset may bring VIA some parity this summer. Still, considering that the Athlon 64 processor is due by September, and will require a whole new mobo platform, KT600 just may be too little, too late. Will enthusiasts even buy Athlon XP boards in the near future? We think most hardcore users—the very people who may be intrigued by the KT600—will wait for specifics on the next AMD revolution before making any moves. ■

CHIPSET	INTEL 875P	INTEL 875P	INTEL 875P	INTEL 875P	NVIDIA NFORCE2	VIA KT400A
Motherboard	ASUS P4C800 Deluxe	Abit IC7-G	Chaintech 9JCS Zenith	DFI LAN Party Pro875	MSI K7N2 Delta ILSR	DFI LAN Party KT400A
CPU	3GHz P4C	3GHz P4C	3GHz P4C	3GHz P4C	3000+ Athlon XP	3000+ Athlon XP
Bus speed	800MHz	800MHz	800MHz	800MHz	333MHz	333MHz
RAM type	Dual Channel DDR400	Dual Channel DDR400	Dual Channel DDR400	Dual Channel DDR400	Dual Channel DDR333	Single Channel DDR400
RAM clock speed	400MHz	400MHz	400MHz	400MHz	333MHz	400MHz
Quake III	**425**	400	404	396	**327**	275
SYSmark2002 Overall	310	306	**315**	299	**258**	243
SYSmark2002 Content Creation	431	436	**440**	421	**331**	320
SYSmark2002 Office	223	215	**226**	213	**201**	185
SiSoft Sandra 2003 INT	**5,113**	4,839	4,894	4,777	**2,562**	2,333
SiSoft Sandra 2003 FLOAT	**5,121**	4,839	4,895	4,764	**2,457**	2,183
3DMark 2001 SE Patched Overall	**16,743**	16,383	16,370	16,354	**15,792**	14,691
3DMark2003 Overall	**4,887**	4,867	4,862	4,864	**4,744**	4,612
3DMark2003 CPU	**754**	714	717	707	**651**	521
UT2003 Flyby 10x7	**227**	220	223	221	**216**	196
UT2003 Botmatch 10x7	**83**	79	81	79	**75**	67
UT Audio Test 10x7 Asbestos Hardware3D	74	**86**	WNR	**86**	**66**	63
UT Audio Test 10x7 Citadel Hardware3D	59	**67**	WNR	65	**64**	61
Actual reported clock speed	3030MHz	3007MHz	3043MHz	2995MHz	2171MHz	2173MHz

Highest scores are bolded.

Copyrighted material

How To...

A step-by-step guide to basic PC upgrades

MAXIMUMPC
TIME TO COMPLETION
02:30
HOURS MINUTES

Easily UPGRADE KEY COMPONENTS

Everything you need to know to safely upgrade your elderly videocard, RAM, and drives with bigger, better, and faster parts

BY ROBERT PALMER MOSELEY

Is your PC tired and sluggish? Is your mom's new eMachine outrunning your aged hotrod? We have just one word: *upgrade!* You need nothing more than a trusty Phillips-head screwdriver and some free time to turbocharge your PC's performance with a RAM or videocard upgrade! With similar ease you can boost your PC's storage prowess by installing a larger hard drive or cutting-edge DVD burner.

Now these may seem like newbie projects for *Maximum PC* readers, but an excavation of our archives revealed an absence of instructions on properly upgrading basic PC parts. We figured it was about time we offered some advice.

Before you crack open your PC, we have four simple rules to keep you—and your hardware—in working order:

- Be wary of static electricity. Discharge your body's static buildup—in other words, ground yourself—by touching any metal object on the PC's case, before you unplug the power supply or handle any hardware. Keep in frequent contact with the metal of the case to maintain your ground.
- Unplug the PC's power *before* you start tampering with your PC's innards. It'll ensure that the power is indeed off and save you from possible electrocution.
- Don't force it. Most components fit snugly into place with minimal effort. If you're straining to, say, get an AGP card into its slot, you probably just broke something.
- Most PC cases have jagged metal edges where you'd least expect them. Be careful when you're rooting around in the case.

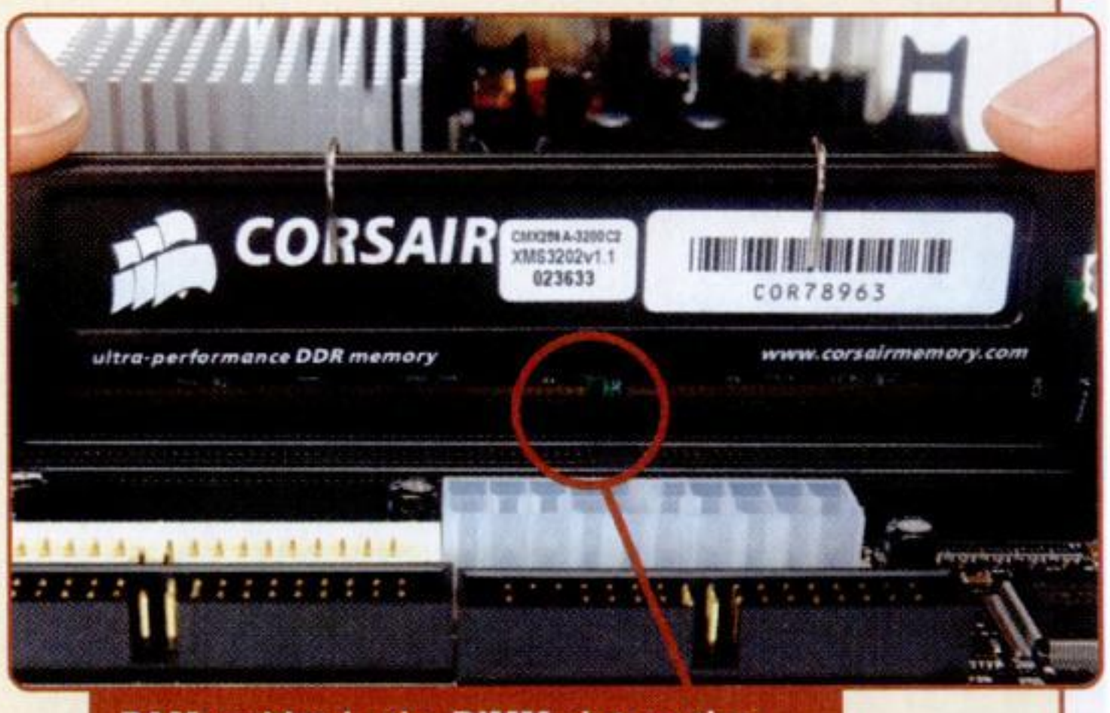
Now go ahead and open your case. Usually it's a matter of removing a couple screws from the side panel, but if your PC has a nonstandard design, consult your documentation. Remember, you can't call yourself a PC enthusiast if you've never broken the seal on your PC, so let's get started.

Get more memory

There are literally thousands of types of RAM on the market today, and unfortunately no easy way to identify the kind that works in your PC. Luckily, Crucial offers a tool on its web site (**www.crucial.com**) that lets you select the make and model of your system to determine the RAM that's right for you.

Once you have your new memory, remove the old RAM by pushing both of the retaining clips—usually white—away from the module. The clips move in an arc, and usually pop the stick almost entirely out of the slot.

Place your new stick of RAM directly into the slot—making certain that the notch in the DIMM lines up with the corresponding tab in the slot. Seating a stick of RAM is the one upgrade that may require more force than feels comfortable. Use the movement of the retaining clips to gauge the pressure you should use. If you're pressing hard and the retaining clips aren't moving, reseat the stick and try again. When the memory is fully seated, you'll be able to click the retaining clips into the notches on the side of the stick with little effort.



RAM resides in the DIMM slot on the motherboard. There is only one way it can fit in, so align the notch on the stick with the tab on the slot, and press straight down firmly.

Copyrighted material

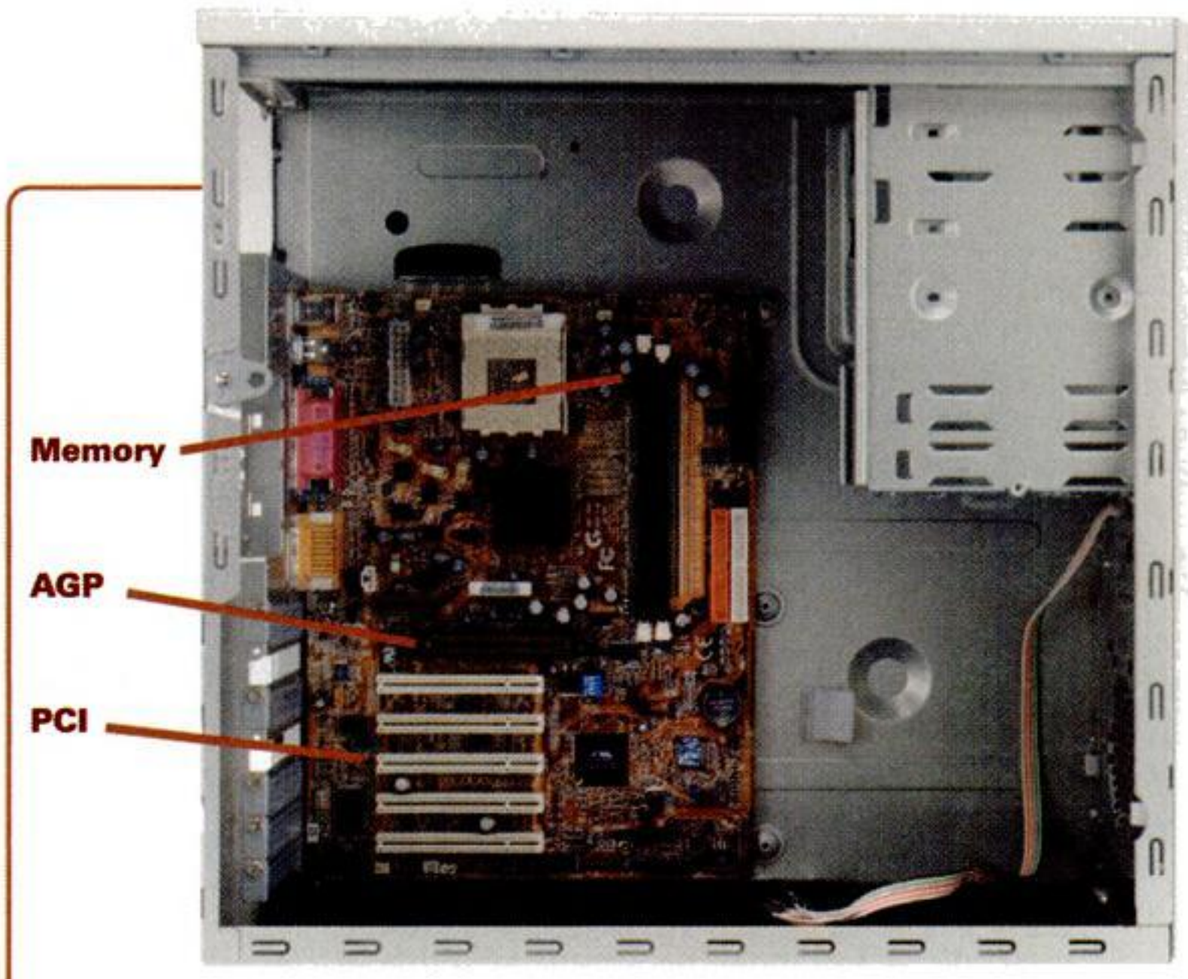
Slot a new PCI or AGP card

With your case open, remove either the card that you're upgrading or the slot cover that's attached to your case. In either scenario, you'll remove the screw that holds the backplane—that metal thing on the back of your PC that the card connectors stick out of—to the case. It's easiest to do this if the case is lying on its side with the open side of the case facing up. Be sure to keep track of the screw, because you'll need it later.

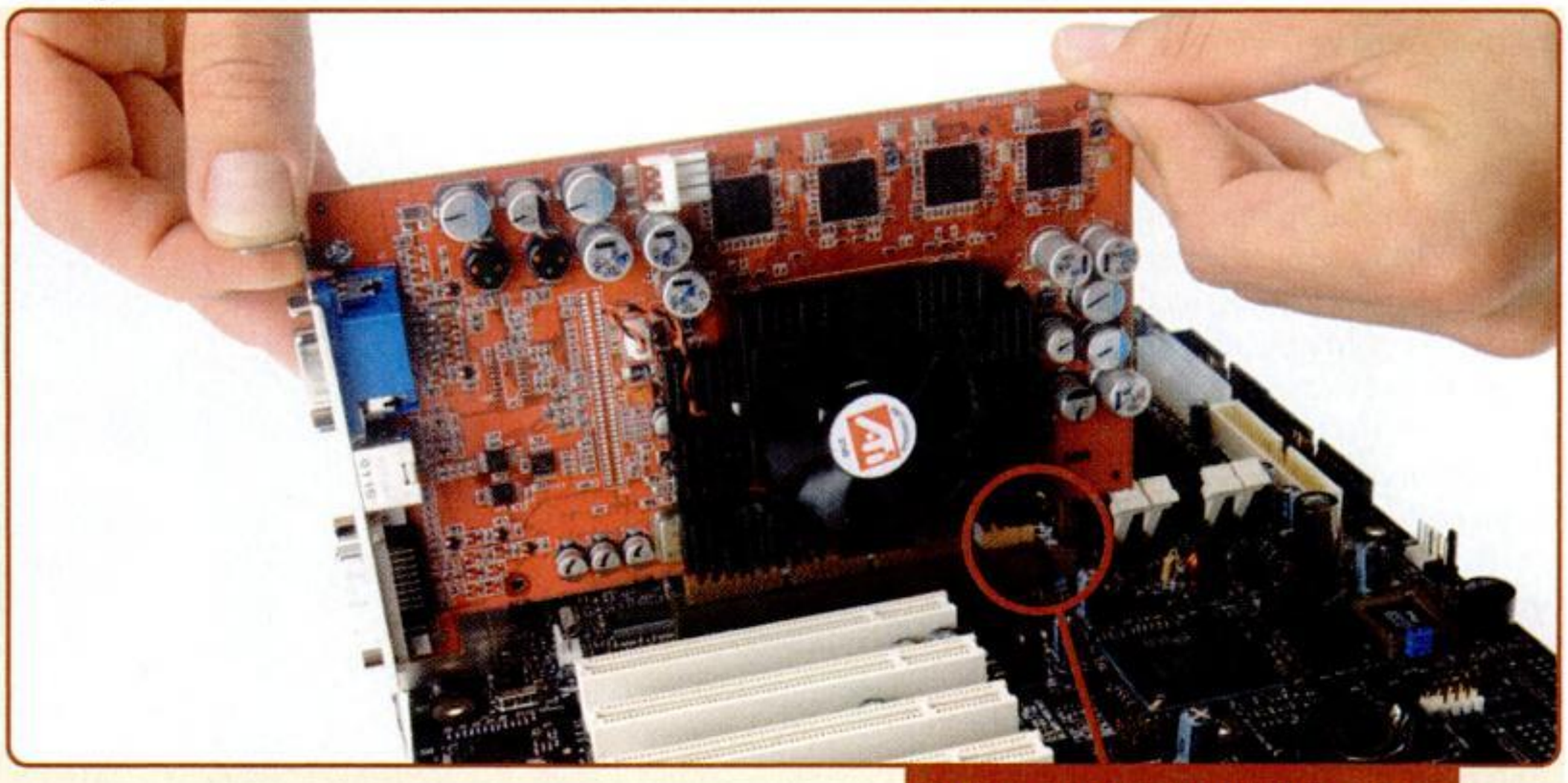
Before you can remove your AGP card, you may need to unhook its retention mechanism. Different mobos have different kinds of latches, but they all hook into the U-shaped nub at the end of the AGP connector. If you're upgrading a newer AGP card, it may have its own separate connection to the power supply, which will need to be disconnected before you can continue.

Remove the new card from its antistatic bag, then line it up over the slot. Make sure the edge with the gold conductors lines up with the slot, and then gently push. If it's a strain to seat the card, it isn't lined up properly. Make sure the backplane lines up with the hole in the case.

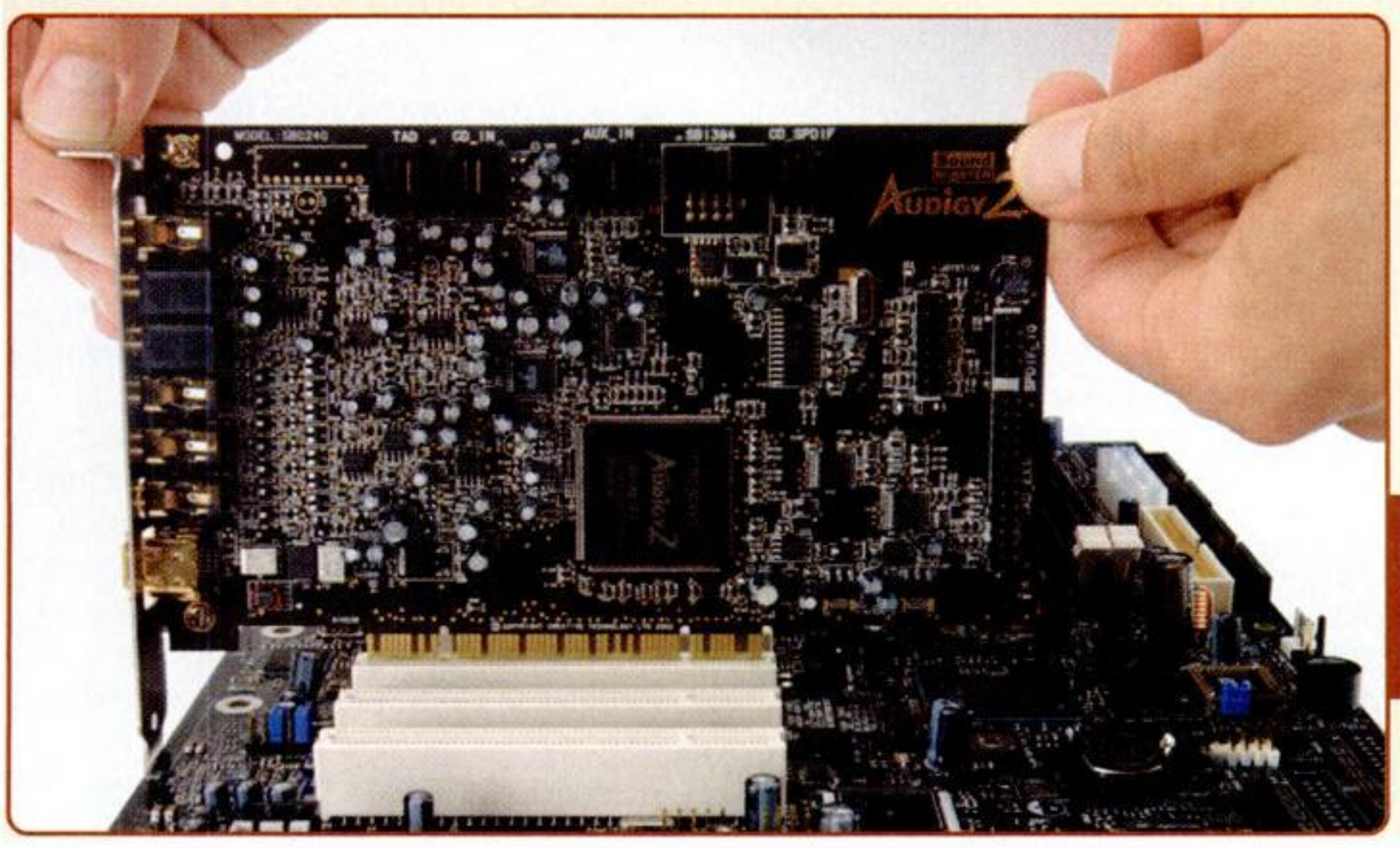
Once the card is seated, screw the backplane to the case. This locks the card down so you can't unseat it accidentally when you move the case or use the external connectors. Connect whatever external devices the card requires, such as a monitor or speakers. The next time you start your computer, Windows will prompt you for the drivers that came with the card. Once you've installed them, the new card should be ready to run.



The interior of your case looks like this. The PCI slots are the white slots near the bottom of the image, and the AGP slot is the lone brown slot above them.



When you're removing an AGP card, be sure to release the locking mechanism.



Installing a PCI or AGP card is simply a matter of aligning the card with the slot and gently pushing down.

Copyrighted material

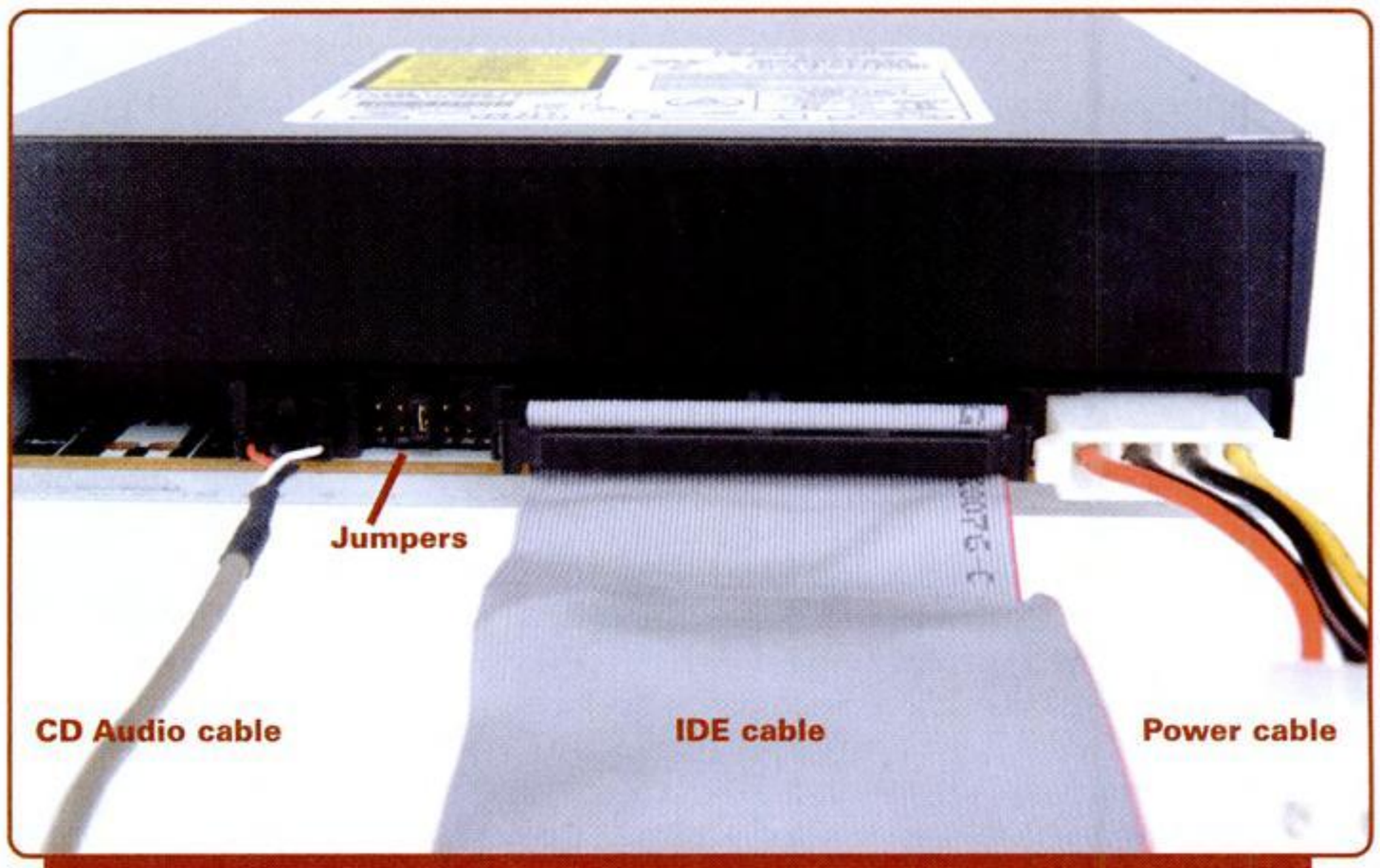
Supersize your storage options

Evaluating your PC's storage options can seem scary to the uninitiated, but when you know the IDE rules, it's not hard at all. Most likely, your PC's built-in IDE controller has two channels, the primary and secondary. Each channel can hold two devices, a master and a slave. This limits most PCs to four IDE devices—hard drives and optical drives—unless you add a PCI IDE or RAID controller.

Even though there can be two devices on a chain at the same time, only one device can transmit or receive data over the IDE bus at a time. This means that you'll want to put devices you'll use at the same time on different channels for best performance. You'll also want the hard drive you boot from to be the master on the primary channel for optimum compatibility. (Older versions of Windows and DOS won't even recognize a bootable drive unless it's the primary master.)

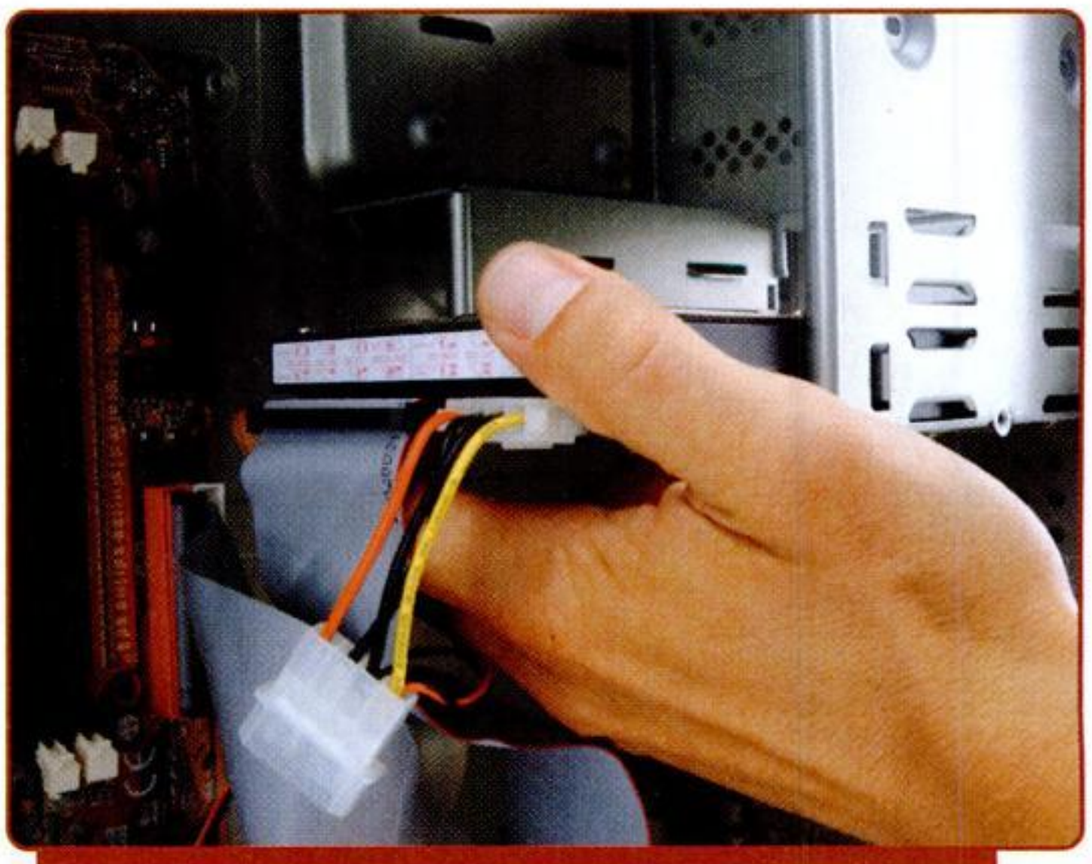
If you're a novice and want to add a hard drive to your system, we recommend that you add it to your existing hard drive, and not make it an outright replacement. That gives you the benefit of more storage without having to reinstall Windows or your favorite apps. On the other hand, there's no reason to have more than one of each kind of optical drive—a CD-burner and a DVD-burner—in your system. Heck, if today's DVD burners would reliably burn CDs at more than 16x speed, we wouldn't even need the CD drive!

Before you install any kind of drive, you'll need to make sure its jumpers are set to jibe with any other drives on the channel. If you're connecting a new drive to the primary channel, it's safe to make that drive the slave, since the original hard drive should be the master (make sure you verify that, though). If you're connecting an additional drive to the secondary channel, check the jumpers of the existing drive and set the jumpers of the new drive accordingly. If you're replacing an older drive, it's safe to use the old drive's settings, provided you connect the new drive to the same channel.



Here you can see the optical drive's power cable, IDE cable, and analog CD Audio cable. Snuggled between the CD Audio cable and the IDE cable are the jumpers that configure the drive's status on the IDE chain.

In addition to the master and slave settings, most drives will also have a cable-select setting. Cable select sets primary and master automatically, based on the drive's position on the cable. We recommend that you avoid using cable select as it can be unpredictable.



Installing a hard drive into a free 3.5-inch bay might require you to remove both sides of your PC case.

Removing an old optical drive is easier than opening the case when your PC uses drive rails.

From this point on, your install will vary depending on whether you're upgrading an optical drive or hard drive, so we'll cover each scenario separately.

Optical drive action

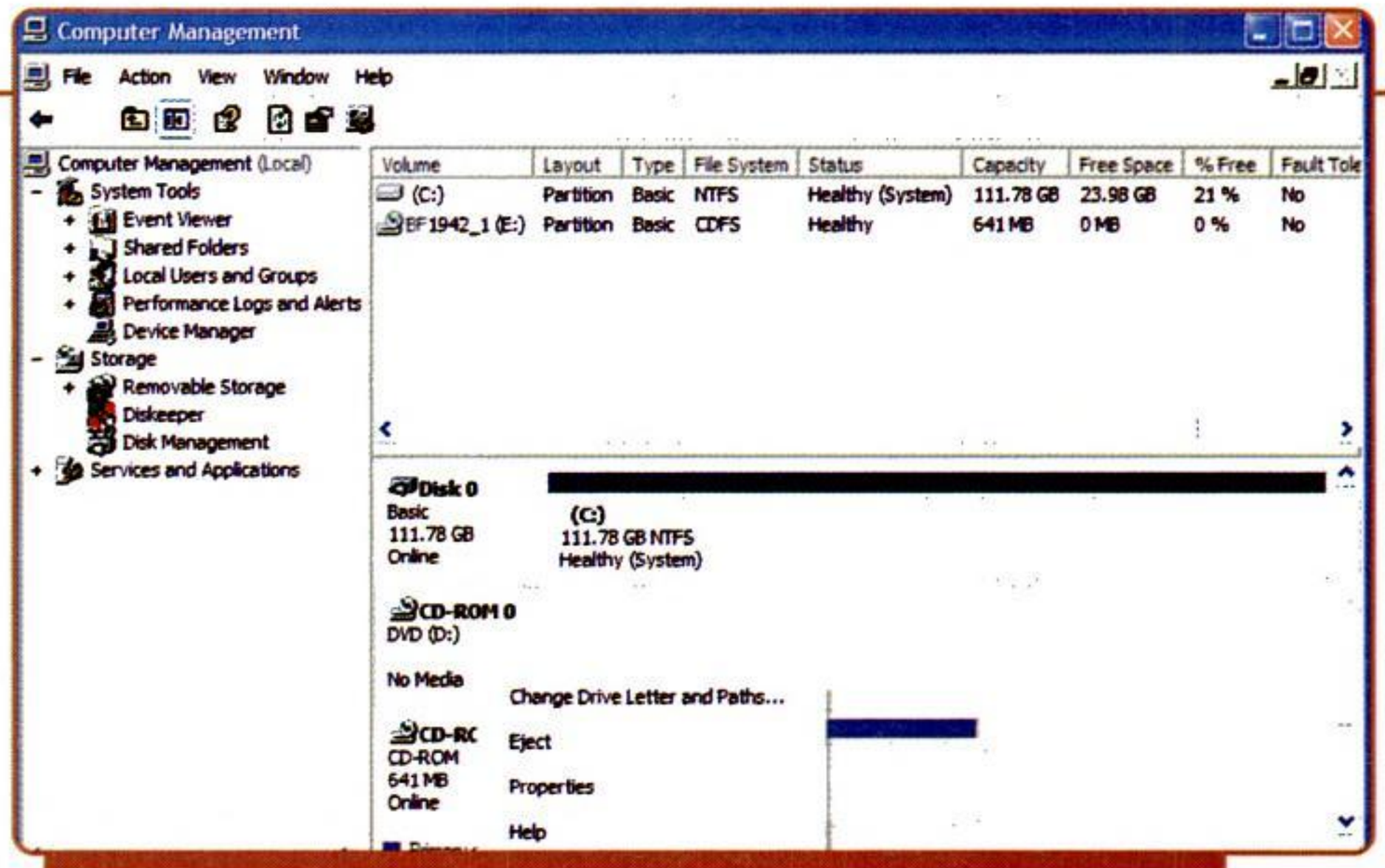
If you're replacing an optical drive, you'll need to remove the old one before you can install the new one. Unplug the IDE cable, the power connector, and the small CD Audio connector. If you don't have a CD Audio connector, don't sweat it. Most new PCs don't use it, but it was standard until mid-2000.

Optical drives are either screwed directly to the drive cage in the case, or fastened in the cage using drive rails. If the drive is screwed directly to the cage, you may need to remove either the drive cage or both side panels in order to remove all the screws. If your case uses rails, you can simply unlock them and slide the drive out of the case. Be sure to remove the rails from the old drive—

Copyrighted material

you'll need them to mount your new drive.

Once you've removed the old drive, you can mount the new drive right where the old one was. Attach the rails, if necessary, to the new drive and mount the new drive in the case. Most optical drives slide in from the outside of the case. Don't forget to reattach the power connector and the IDE cable, but there's no reason to reconnect the analog audio cable unless you're still using Windows 95 or NT4, which don't support digital audio extraction. Move on to the "Testing and Troubleshooting" section once your PC is up and running.



The Computer Management program lets you create partitions, format drives, and even change drive letters.

Hard drive doings

Most machines have multiple mounting points for hard drives, but not all the mounting points will be close enough to the other devices that will share the common 18-inch IDE cable. With cable length in mind, scout out the inside of your case for a convenient place to mount another 3.5-inch hard drive. There are often suitable mounting bays beneath the external drive bays or above the power supply. Since this is your second hard drive, it should be on the secondary channel, to maximize disk-to-disk copying speed.

Once you've decided where you're going to mount your drive, and double-checked that the drive is jumpered properly, you can slide it into the drive cage and screw it into place. We like to secure our hard drives with four screws—any more is overkill, any less could allow the drive to move, destroying our precious data.

Connect the power and IDE cables, power up the system, and continue on to the next section to test your new drive.

Testing and troubleshooting

Once your drive is mounted and plugged in, you should reconnect power and boot into Windows. Don't worry about closing the case just yet; you may need to make some adjustments before you're done.

If you're adding a new drive, as opposed to upgrading an existing one, you may need to go into the BIOS and auto-detect the drive before it will show up in Windows. Enter the BIOS by pressing F1, F2, or Del as the computer boots. The IDE detection options are usually within the Advanced tab or the BIOS Settings tab, depending on your motherboard. Set the drive type to Auto, and reboot the PC.

If the BIOS doesn't detect the new drive, you've probably either neglected to reconnect all the cables or incorrectly set the jumpers on one or more of your drives. You can also try running the drive on its own IDE chain. Remember to power down and unplug the PC before you make any adjustments inside the case.

If the BIOS detects the drive, Windows should also auto-detect it with little fuss. If the new drive isn't available the first time you open My Computer, you may need to manually set its drive letter in the Computer Management program. In Windows XP, go to Start then Run, and type `compmgmt.msc` in the Open box and press Enter. This opens the Computer Management program. Now go to the Storage section and click Disk Management. Right-click your new drive and select Change the Drive Letter to replace it with a letter that isn't already taken by a removable or network drive.

You may also need to create a partition on your new hard drive in order to assign it a drive letter. Right-click the drive in Computer Management, then go to Create New Partition. If you are going to have just one partition on the drive, a primary partition is the best choice.

At this point, your optical drive should be running and ready to burn. A new hard drive on the other hand still needs formatting to make it usable. Right-click the drive in Computer Management and select Format. We recommend using the NTFS file system. Do not select Quick Format or Enable Compression. For a large drive, formatting may take a while, but you're free to use the computer for simple tasks while you wait.

What should you upgrade first?

How you use your computer determines what components you should upgrade first. A hard drive upgrade probably won't buy you much in the way of performance, but it will save you from having to micromanage your disk space if you're running low. Upgrading your system memory from 256MB to 512MB or more will improve performance in applications and games in Windows XP, but Windows 98 or ME users might not see any benefit. A videocard upgrade can give you much higher frame rates in your games, but may not make much difference in other Windows apps.

Finally, if you're the type of person who usually buys prebuilt systems, there's a point where it becomes more cost-effective to buy a new PC than upgrade an old one. If your machine is more than 18 months old, or has a CPU that's slower than 2GHz, we recommend you cap your upgrades at $700. If it's going to cost you more than that, the money is better spent on a more modern PC. ■

Copyrighted material

Ask the Doctor

Symptom ▶ Diagnosis ▶ Cure

FORGETFUL CMOS

I just built a new PC and am having some minor problems. I try to do maintenance once a week, and this week I noticed that when I turned on the PC it indicated that I was running an AMD 1500+ 1.35GHz, even though I bought a 2200+. This is very odd, because it has never occurred before. My PC is just six months old, and all the parts were bought retail. Could you please tell me what's going on?

—MATT GARCIA

The Athlon 2200+ normally clocks in at 1.80GHz, or a 13.5 multiplier on a 133MHz bus. It sounds like your BIOS was reset and defaulted to a 100MHz bus. With a 100MHz bus, your 2200+ runs at 1.35GHz speed—the same speed as an Athlon 1500+. To reset it, just go into the BIOS by hitting either F1, F2, or DEL (it depends on your mobo, so look for a prompt) when your PC boots. Once in the BIOS, root around in the menus for information pertaining to the frontside bus (FSB). Reset the FSB from 100MHz to 133MHz. Use some caution when in the BIOS, as an incorrect setting can totally muck up your system. There's no harm in looking around, just don't change any settings you don't understand.

Why did your machine do this? It's possible that the BIOS defaulted to the 100MHz bus speed because of a failed overclocking attempt, a static discharge in your PC, or a CMOS battery that needs replacing.

> ***"THE GATOR PROGRAM RUNS IN THE BACKGROUND, MONITORING THE SITES YOU BROWSE AND DELIVERING ONLINE ADVERTISING TARGETED TO YOUR TASTES."***

PLAY IT AGAIN, SAM

I have a 2.4GHz Northwood Pentium 4. I'm not sure how to set the clock speed of it, but when I start the computer, it shows it running at 1.8GHz. Can you tell me how I can set it correctly? I'm not sure if this is related, but sometimes when I turn on the PC, it doesn't pick up the hard drive, and tells me to insert the Windows XP CD. Can you tell me why this may be happening?

—OMONIKE ARABA

This problem must be infectious. You likely have the same problem as Matt (see above). If your CMOS was reset to the defaults, your frontside bus speed could have downshifted from 133MHz to 100MHz. The Doctor's guess is based on the perfect match your clock speeds fall into. Your 2.4GHz Pentium 4 consists of an 18 multiplier on a 133MHz bus. That yields a clock speed of roughly 2.4GHz. If the bus speed is reset to 100MHz, your CPU would show up as 1.8GHz, or 18 x 100MHz. Simply go into your BIOS by hitting F1, F2, or DEL at boot and hunt around for the frontside bus setting that will let you move it from 100MHz to 133MHz.

Why did your CMOS get reset? Just as with Athlon systems, most CMOS resets are the result of static discharge, a bad battery, or a failed overclocking attempt. Since you mentioned that your machine sometimes can't find the hard drive, the Doctor believes your CMOS battery is failing. Open up the machine, find out which coin cell it is (likely a CR3032) and replace it with a new one. A battery normally lasts two or three years but can be affected by several factors, including the length of time a PC is unplugged from the wall, the average temperature it's stored at, and the brand and condition of the battery. Once you have a new battery installed and you have your PC set to boot from the hard drive, your problems should go away.

GETTING RID OF GATOR

I've been wondering what the GMT.exe file is. All I know is that it takes up a lot of my RAM.

—SHAWN MCCREA

Thanks to the Gator Corporation, your computer's been infested with ad-ware. You probably installed Gator unwittingly when you either installed an app from a site that uses Gator as a revenue source (*AudioGalaxy* being the most prominent), or browsed a web site with a Gator ad in *Internet Explorer*, where you were prompted to install an ActiveX control.

Once installed on your PC, the Gator program runs in the background, monitoring the sites you browse and delivering online advertising targeted to your tastes. These ads take two basic forms: pop-ups that appear in your browser when you visit sites containing a keyword, or banner ads that overlay the banner ads of legitimate web sites.

Gator is bad for several reasons. First, it collects and broadcasts everything about your web browsing habits, including all the sites you visit, to the Gator Advertising network. Second, by overlaying a site's legitimate ads, Gator can display offensive or inappropriate ads, which can unfairly anger visitors to a site. Third, by overlaying a site's ads, the site loses the meager revenue it may make on the ads. Finally,

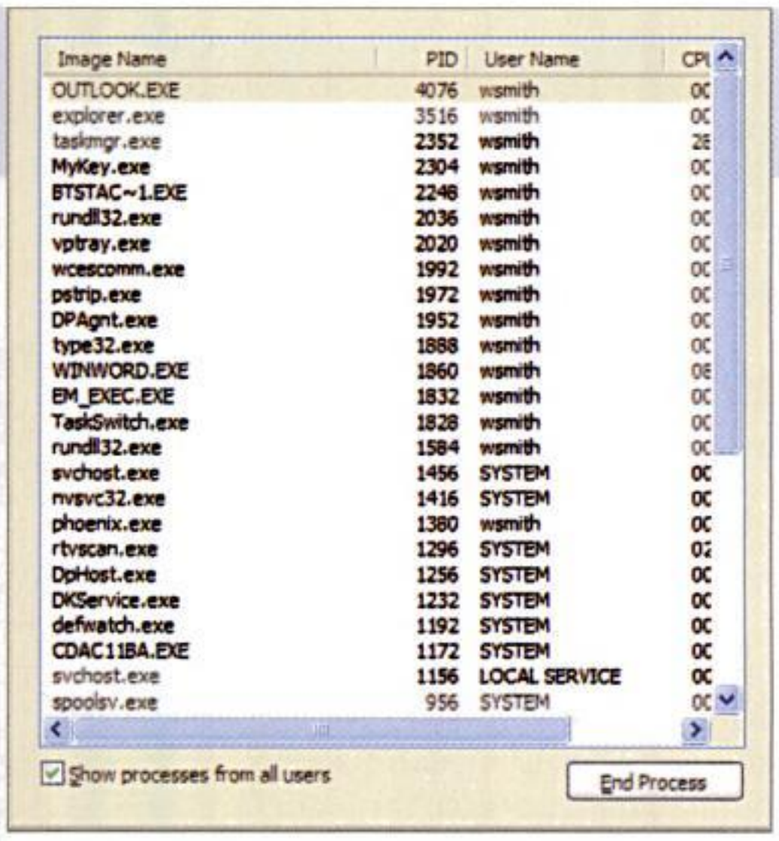
continued on page 56

TESTY TASK MANAGER

I'm using WinXP, and whenever I press Ctrl+Alt+Delete to bring up the Task Manager, it's missing the portion with the tabs and menu choices. I can't figure out how to get to the Applications screen, it's stuck on the CPU usage screen. It doesn't have a title bar or the normal maximize, minimize, and close icons in the top-right either. Please help.

—MG

We're pretty certain the Doctor's covered this one before, but we'll hit it again just for you, MG. You must have inadvertently double-clicked on some grey space inside the Task Manager window. That action hides the normal menus and tabs, just like you described. To get them back, all you have to do is again double-click on a grey area in the window. As for the utility of this furtive feature, we're at a loss.



For some reason, Task Manager has a minimal-interface mode that hides everything but the tab you're using.

Copyrighted material

COMPUSA® AND MAXIMUM PC MAGAZINE PRESENT:

THE "COOLEST PC" CASE MODDING CONTEST

YOU'VE CONCEIVED THE IDEA FOR THE PERFECT PC.

Whether it's edgy, aggressive designs that get your heart-a-thumping or sleek, minimalist creations that strike your fancy, we want you to turn inspiration into realization. You are limited only by your imagination and a looming deadline. So, free your mind of yesterday's preconceptions and create the "coolest PC."

TO ENTER: Your submission packet must include your name, street address, and daytime phone number; three high-resolution JPEGs of your modified case; and a 300-word description of what your PC represents, and how it was modified. Emailed submissions go to input@maximumpc.com. Snail mail submissions go to Case Modding Contest c/o Maximum PC, 150 North Hill Drive, Suite 40, Brisbane, CA, 94005. Maximum PC editorial staff members will judge the contest, and they will be basing their decision on the following criteria: craftsmanship, creativity & originality.

Submit the "Coolest PC" and

WIN A $3,000 SHOPPING SPREE

at CompUSA®, your source for mod parts.

Plus, get unlimited bragging rights—the winning PC will be featured in the December 2003 issue of Maximum PC magazine.

Some Theme Suggestions to Get You Started:

- Space
- Comic or Cartoon Characters
- Sports Cars
- Textures (iron, metal, industrial, etc.)
- Disco
- Movies

RULES: One entry total per individual. All entries must be received no later than September 30, 2003, with the winner being announced on or around November 5, 2003. Each of the judging criteria (craftsmanship, creativity, and originality) will be weighed equally at 33%. By entering this contest you agree that Future Network USA, Inc. and CompUSA may use your name, likeness, and web site for promotional purposes without further payment. The prize will be awarded and no minimum number of entries is required. Prize won by a minor will be awarded to their parents or legal guardians. Neither Future Network USA nor CompUSA is responsible for damages or expenses that the winner might incur as a result of the Contest or the receipt of the prize, and the winner is responsible for income taxes based on the value of the prize received. The winner's name may also be obtained by sending a stamped, self-addressed envelope to Future Network USA, Inc., c/o Case Modding Winner, 150 North Hill Drive, Brisbane, CA 94005. This contest is limited to residents of the United States. No purchase necessary; void in Arizona, Maryland, Vermont, Puerto Rico, and where prohibited by law.

COMPUSA®

WHERE AMERICA BUYS TECHNOLOGY℠

Copyrighted material

#30278

continued from page 54

no one likes pop-up ads. They're just plain annoying.

By searching Google, we found quite a few pages dedicated to the extermination of Gator, and the methods vary depending on the version of Gator software installed on your system. First, you'll need to stop the GMT.exe process by right-clicking the Taskbar, clicking Task Manager, then going to the Processes tab, selecting gmt.exe, and clicking End Process. Once that's done, you can open MSConfig by pressing Windows key + R and typing msconfig, then pressing Enter. Go to the Startup tab, and uncheck the item named gmt.exe. If you find your PC infected again, you've got another piece of software installed on the system that installs Gator. We recommend spyware busters, such as *Ad-Aware* (www.lavasoftusa.com) or *Spybot* (http://security.kolla.de/) to keep out the riff-raff.

DISORIENTING DVD RECORDABLES

I'm a little confused about DVD nomenclature. What are the differences between +R and -R, +RW and –RW? I know Sony makes a drive that writes in all these formats, and that you highly recommend it. What do the different modes represent, and why would I need one over the other?

—JIM MILLER

The Sony DRU-500A is our favorite multi-format DVD recordable drive at the moment, but we hear that several other manufacturers, including Pioneer, will be releasing them soon!

If you are only "a little confused" about DVD standards, you're in good shape. We covered the technical differences in September 2001 ("Beyond The X-Rating"), and not much has changed since then. Here's the three-paragraph rundown.

CD burners have a write-once format (CD-R) and a rewriteable format (CD-RW). DVD burners have two write-once formats (DVD+R and DVD-R) and two rewriteable formats (DVD+RW and DVD-RW). The dual formats are the result of an ugly "Pioneer versus everyone else" standards war—one which never saw a clear winner.

The effective differences between the formats are slight. In the Doctor's experience, DVD-RW discs tend to be more compatible with set-top players than DVD+RW discs. But how useful is it to be able to rewrite to your DVD Video discs? Not very, in our opinion. And the compatibility of the write-once formats is virtually the same.

Most manufacturers are moving toward dual-format drives. Having a dual format drive means you can make test discs in all four formats to see which ones are most compatible with your DVD-ROMs and set-top devices. Let's hope the next generation of optical technology will go a little more smoothly.

GOT NO GAME

For some unknown reason, whenever I build a system it crashes, and my new system is no exception. I'm running Windows XP SP1 with an Athlon XP 2600+, an Asus A7N8X Deluxe mobo, an ATI All-in-Wonder 8500 videocard, and a 400W power supply.

When I'm playing a game, my system just restarts. I've checked my drivers to ensure that they're up to date. I have run benchmark tests (*SiSoft Sandra*, *3DMark2000* and *2001*), a burn in test (*SiSoft Sandra*), and virus checks, all of which finish fine. What could be the problem?

—JESSE CASTRO

A few things could be causing your problem. Overheating or power supply issues frequently cause random reboots. You could also have out-of-date chipset drivers—also known as 4-in-1 drivers—but they're the least likely culprit; usually bad chipset drivers cause crashes rather than spontaneous reboots.

A 400W power supply should be more than sufficient for the hardware in your box, so we'd start by tweaking the cooling. Ensure that the CPU fan is still working properly, and make sure the heatsink is still on your motherboard's chipset. You should also have at least one or two fans pushing air through your system. We recommend sucking air into the case from the front and blowing it out the back. That draws air over your videocard, chipset, memory, hard drives, and CPU before it's expelled from the system. Adding an 8mm fan to the front of the case could solve your problem.

If you still have crashes after adding another case fan, your CPU cooler may not be seated properly. You should remove the CPU heatsink, clean the thermal paste off the cooler and CPU using a lint-free cloth and some rubbing alcohol, and then reapply a thin layer of thermal paste to the CPU, and carefully remount the heatsink. Don't use too much force when you're locking down the cooler—you don't want to crush your Athlon!

Just for good measure, you should go to www.nvidia.com and download the latest Platform/nForce driver from their Driver Updates page. That's the nForce equivalent of Via's 4-in-1 driver.

I'LL BURN IT MY WAY

My Pioneer DVR-A05 is listed as a 4x DVD recordable drive. But when I use reasonably priced locally available DVD-R media, it burns at just 1x. I spoke with a buddy who bought the A04, and he is able to burn the same brand media that I use at 2x without any problems.

> "DUAL FORMATS ARE THE RESULT OF AN UGLY STANDARDS WAR—ONE WHICH NEVER SAW A CLEAR WINNER."

The tech guys at Pioneer have offered a number of different explanations, including that having more than one piece of burning software on my system would cause the burn speed of my drive to slow down. They also said that they couldn't help me with *Nero*—my preferred burning software—since they offer *Easy CD Creator* with the drive. I don't want to risk installing *Easy CD Creator* because I've read that *Nero* and *Easy CD Creator* do not play well together.

The second question I have pertains to the "no stickers" icon inside the jewel cases of some expensive Apple 4x DVD-R media. I called Apple, and was told that adding a conventional CD-type label could cause the platter to go off balance. Are they just being overly cautious, or is there something to what they say?

—TOM

All the questions you've asked—from using off-brand media to installing your own burn software—involve doing things that aren't recommended by your drive's manufacturer. And when you stray from manufacturer recommendations, you're likely to encounter some problems. Let's look at some of those problems and establish how serious they could be.

The media: Even if your software supports it, we don't recommend overriding the maximum write speed for your disc as determined by your drive. Ever. You're likely to end up with discs that are riddled with errors (which you won't discover until you try to access files near the middle or end of the disc, of course). Or your discs could end up incompatible with any drive other than the one on which it was burned. If you want a quality, fast burn, stick with quality, brand-name media. Preferably the brand recom-

Just like a refreshing sip of lemonade, the Doctor is here with your monthly dose of hardware healing and software solutions. If your PC has a malady not mentioned here, send an e-mail with your name, address, and phone number to **doctor@maximumpc.com**. Keep in mind: The Doctor gets a lot of e-mail, and can't respond to everyone.

Copyrighted material

mended by your drive manufacturer.

The software: You're right about *Nero* and *Easy CD Creator*—they're like Seinfeld and Newman in the same building. *Nero's* great, but you might try replacing it with *Easy CD Creator*, which has vastly improved in the last year. You can always go back.

The stickers: A label that is placed even slightly off-center will result in a very slow burn-time (sub-1x) or a failed burn altogether. And the Doctor has found that putting stickers on discs dramatically reduces their compatibility with other players, especially set-top boxes. It's your call. If you want to get fancy, consider Epson's Stylus Photo 900 ($200, www.epson.com), reviewed last month. It prints directly on the discs' surface.

VIDEOCARD ANSWERS

We asked you for follow-up questions to our June cover story, "Videocard Answers," and boy-howdy did you send them in. Here are the latest inquiries, answered!

OC MYTHS AND MISCONCEPTIONS

I have a GeForce2 GTS on a Dell Dimension 4100. In the last issue I read how to overclock the videocard. I'm wondering what some of the negative effects of overclocking are. Can your card actually catch fire or mess up the whole motherboard if something goes wrong? Is it safe to overclock my GeForce2 without extra cooling?

—IGOR TATARINTSEV

We've never actually managed to set anything ablaze in our overclocking adventures, but we have heard reports of smoke and that dreaded burning smell coming from inside a case. Generally, when we say you could "fry" your hardware, we mean you could render it nonfunctional.

The worst thing we've seen happen as a result of videocard overclocking is a dead or unreliable board; it's unlikely that overclocking your videocard will do harm to either the motherboard or CPU.

There were about 25 different configurations of GeForce2 from the time the first one launched until the last GeForce2 MX shipped, so it's hard to give you a definite answer. If your GeForce2 has a heatsink with a fan, you should be able to safely overclock a little (we recommend using smaller increments than those suggested in July's overclocking feature). If your card has a heatsink but no fan, the Doctor suggests you not overclock.

BROKE A LITTLE BROWN THING

I have a 9000 Pro with 128MB DDR. While I was placing a new heatsink and RAM sinks on the board, I accidentally popped off one of the little brown things on the board. I put the card back in my machine and it works fine, but it seems a little unstable. I was wondering if the card is going to fry my computer when I'm not looking, or will it just remain unstable?

—MIKE D.

You're lucky that the board still works at all. We'd guess that you broke off a capacitor, rather than a resistor. Regardless, many of the resistors, capacitors, and other electronic components soldered to a videocard are there to condition the power your system provides into something the GPU and onboard memory can use. Because you snapped one off, your videocard won't be as reliable at it once was. The Doctor doesn't think the amputated board will cause damage to the rest of your system, but there's no way to be sure. We recommend you get a replacement as soon as you can.

DO PRO-LEVEL VIDEOCARDS SUCK FOR GAMES?

I'm building a system for light gaming, and I want to make sure it will play *Doom3*. I'm getting into 3D animation, using *LightWave 5.5* and *3ds max*. I also want to dabble with C++.

From what I understand, the ATI FireGL X1 is great for the 3D modeling stuff, but I've read reviews on other professional videocards that say even though these cards cost big bucks, they suck for games. Is this really true? If so, I'm just going to get a Radeon 9600 Pro.

—RICHARD RHEA

We've said it before and we'll say it again: If you want to game, get a gaming card. If you want to do 3D modeling, get a professional card. If you want to play games and dabble with 3D editors, get a gaming card.

Today's professional-level cards ship with specialized drivers designed to work flawlessly with *3ds max* and other professional-level tools. They also ship with OpenGL drivers—and other proprietary drivers—for apps like *AutoCAD* that are used to design airplanes and bridges. These drivers have to be rock-solid and produce 100 percent accurate renders. The cards don't need to be able to draw and light millions of pixels quickly, but they do need to be crash-free.

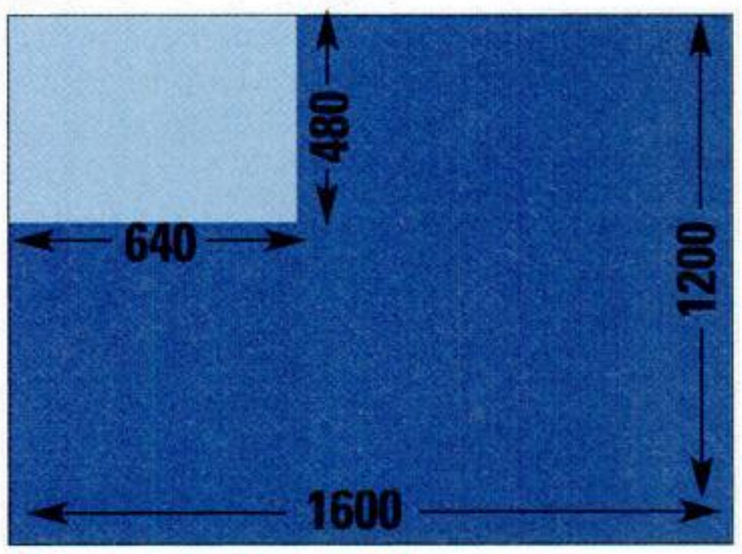
On the other hand, gaming cards need to be fast, fast, fast. They also need to have robust DirectX drivers for games. Many pro-level cards don't even include DirectX drivers suitable for gaming.

If you're serious about using professional apps, the Quadro FX series by nVidia has suitable performance and drivers for gaming. Otherwise, save a few hundred bucks and pick up a Radeon 9600.

A SIMPLE QUESTION

Why do higher resolutions run slower than low resolutions?

—BILAL KAHWAJI



Higher resolutions run slower than lower resolutions because the number of pixels on screen rises exponentially as you up the res. More pixels equals more work for the card.

Running at higher resolutions is slower mainly because the videocard needs to draw more pixels onscreen. At 640x480, a card draws at least 300,000 pixels, but at 1024x768 it puts approximately 800,000 pixels onscreen. At 1280x1024 that number balloons to 1.31 million pixels. Every time a texture or lighting effect is applied to a pixel, some of the finite memory bandwidth between your GPU and your videocard's RAM is consumed. Naturally, when there are 1.3 million pixels on the screen, more memory bandwidth is consumed than when there are just 300,000 pixels being drawn.

High resolutions combined with memory bandwidth–intensive features such as antialiasing and anisotropic filtering make the slowdown even more pronounced.

WHAT'S GOOD VIDEO QUALITY ANYWAY?

Are there any differences in actual 3D video quality from one card to another? For instance, does the Radeon just look nicer onscreen?

—JEREMY BIFFIS

The differences in 3D visual quality can be broken down into three categories: rendering accuracy, color accuracy, and filtering quality. Rendering accuracy is just what it sounds like. The extra polygons, holes, misaligned textures, and other problems within a drawn scene can be attributed to a 3D accelerator's rendering errors, though these are fairly rare these days.

Color accuracy is a subject of much debate. Some cards definitely produce a more vibrant, lush output than others. But it's difficult to judge color accuracy in games. Most videocard reviewers don't have access to the original source art used for the game, and factors as seemingly innocuous as the length of time our monitor's been on can affect color reproduction.

Filtering quality is what most people are referring to when they say a card has good image quality. Good anisotropic filtering will be smooth and scale a texture easily from the foreground to the background. Good antialiasing will smooth the jagged edges of rendered polygons. Bad aniso or antialiasing won't appear to do anything at all, or can even distort the scene! ■

Copyrighted material

In the Lab

A behind-the-scenes look at Maximum PC testing

Making Sense of the nVidia-3DMark Imbroglio

Futuremark issues—then retracts—accusation of benchmark impropriety

The nVidia GeForce FX 5900 came under intense scrutiny after allegations of benchmark cheating surfaced.

The week after we sent our July issue to press, ExtremeTech.com went public with a story accusing nVidia of using questionable optimizations to boost *3DMark 2003* scores for review samples of the GeForce FX 5900 Ultra videocard. The web site determined that when teamed with nVidia's 44.03 Detonator drivers, the 5900 Ultra was drawing only the visible portions of the Game 4 programmable shader test, and not the entire scene. This gave the nVidia card high frame rate scores—at least compared with those of ATI videocards, which have always drawn the entire scene.

The accusation ignited a firestorm. Was nVidia "cheating" by sacrificing visual quality, or was the company using legitimate optimizations? After all, there's nothing wrong with taking shortcuts if visual quality doesn't suffer—it's called efficient coding.

Futuremark, which develops and publishes *3DMark 2003*, accused nVidia of "cheating" by replacing *3DMark 2003*'s hardware requests with alternative instructions that are less GPU-intensive. In a nutshell, Futuremark argued, nVidia cards were artificially increasing their benchmark numbers by doing less work than other cards. As a result, Futuremark audited *3DMark 2003* and issued the 3.30 patch to remove several nVidia "optimizations." The audit also revealed and removed ATI "optimizations," although those had no effect on visual quality.

In the chart below, we report how nVidia's and ATI's fastest cards perform with each version of the *3DMark 2003* testing suite. As you can see, with the patch in place, the performance of the 5900 Ultra dropped about 50 percent in Game 4, whereas the ATI 9800 Pro suffered a mere 2.2fps hiccup.

BENCHMARKS	GeForce FX 5900 Ultra		Radeon 9800 Pro 256 MB	
	VERSION 3.20	VERSION 3.30	VERSION 3.20	VERSION 3.30
3DMark 2003 Game2	41.9	37.5	35.9	35.8
3DMark 2003 Game4	37.3	19.1	32.1	29.9
3DMark 2003 Overall	5925	4743	5415	5329

Benchmarks are run on our graphics zero-point, a Pentium 4B, 3.06 GHz system with 512MB of PC1066 RDRAM, and Windows XP Professional.

To confuse matters even more, shortly after the release of the 3.30 patch, Futuremark retracted its cheating allegation, stating that "nVidia's driver design is an application-specific optimization and not a cheat."

That's a diplomatic explanation, but we don't think nVidia's 44.03 driver updates were good for 3D card buyers. The results of these tweaks are only visible in the beta tester's version of *3DMark 2003*. If you have the standard version of the benchmark, all test runs are "rendered on a rail"—the camera moves along on a fixed path. But if you have the beta tester's version, you can pause the benchmark at any point, and move about the environment at will, just as if you were in a real game. When you do this, you can see massive clipping errors caused by the unrendered content. This is kosher for a non-playable tech demo, but it's unacceptable for a benchmark, which by definition needs to be rendered in its entirety in order to produce valid benchmark results for a wide variety of videocards and video drivers. Anyone running a benchmark—a journalist, a consumer, whoever—should be able to expect that all content is being rendered in its entirety, each and every time.

At *Maximum PC*, we use Game 2 and Game 4 in *3DMark 2003* to gauge the performance of the programmable shader units in today's videocards. Normally, we eschew synthetic benchmarks like *3DMark* in favor of real-world tests, but because there are no reliable shader tests available today, we do look to Game 2 and 4 for performance indicators. (*Half-Life 2* and *Doom3* better include benchmark tests, or our heads will explode!)

In the context of *Maximum PC* coverage, the nVidia driver tweaks mainly affect the videocard reviews we ran in our July issue. We don't change verdicts after an issue goes to press, but based on the latest benchmark scores (using *3DMark 2003* version 3.30), we would probably give the Radeon 9800 Pro 256MB a 9 verdict and Kick Ass award, and the All-in-Wonder 9800 Pro a Perfect 10 (along with the Kick Ass, of course). The GeForce FX 5900 Ultra would retain its 9 verdict and Kick Ass award. We're concerned by the FX's low score in Game 4, but not enough to drop its score.

As of today, the FX 5900 Ultra and the 9800 Pro 256MB are very evenly matched. The GeForce FX performs better in games that lack programmable shader support, but the ATI card is significantly faster in shader tests. We'll continue to run the 3.30 version of *3DMark* for our benchmarks—at least until we see a real-world game that can reliably test programmable shader performance.

Copyrighted material

Zip-Linq Retractable Cables

Zip-Linqs are the ultimate solution to cable management. No longer do you have to worry about stuffing and tying cables together, because the Zip-Linqs adjust to *your* optimal length on the fly. The cables extend to 2-feet long, and retract when you pull on both ends simultaneously. Available versions include USB 1.1; six-pin FireWire to four-pin FireWire; CAT 5 Ethernet; and six-pin FireWire to six-pin FireWire. Prices run from $13 to $16 depending on the cable.

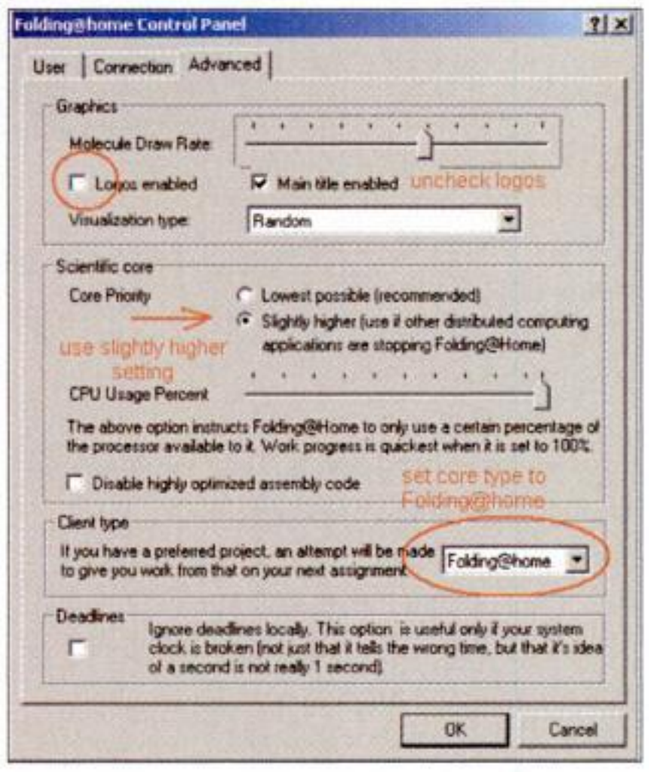
www.ziplinq.co

Folding@Optimizations

If you're running the distributed computing client *Folding@Home*—it's trying to unlock the secret of human proteins—you may be wasting time if your PC isn't optimized. *Maximum PC's* Folding@Home Team has put together a short guide on how to make the client more efficient, so make sure you check it out at MaximumPC.com.

The tips include advice on how to properly configure the client, and how to run multiple clients on dual-CPU and Hyper-Threaded machines. The guide also explains that team members should fire up the client with the flags "-local –advmethods –forceasm" to make the distributed number-crunching more efficient.

To join the *Maximum PC* team, download the client from **www.stanford.edu/group/pandegroup/folding/index.html** and enter team 11108. Team Maximum PC is in the top 10 of the leader board, and in hot pursuit of a top five position.



Best of the Best

As of August, 2003

Here are our current top picks for each hardware category. Red text indicates first month on chart. This month the big news is a tie in the high-end videocard category (see preceding page for the details). We've also divided the hard drive category into two separate picks (one for parallel ATA, one for SATA), and followed suit with separate picks for Palm and Pocket PC PDAs, as well as separate picks for high-end and low-end CRTs.

High-end videocards:
nVidia GeForce FX 5900 Ultra and ATI Radeon 9800 Pro 256

Budget videocard:
ATI Radeon 9600 Pro

Do-everything videocard:
All-in-Wonder Radeon 9800 Pro

Soundcard:
Sound Blaster Audigy 2 Platinum

Serial ATA hard drive:
Western Digital 360GD Raptor

Parallel ATA hard drive:
Western Digital WD2500JB

CD-RW drive:
Plextor PlexWriter Premium

DVD burner:
Sony DRU-500A

LCD monitor:
Sharp LL-1820

High-end CRT monitor:
Sony F520

Budget CRT monitor:
Cornerstone P1750

P4 motherboard:
Intel D875PBZ

Athlon XP motherboard:
Asus A7N8X Deluxe Rev 2

Portable MP3 player:
iPod 20GB

Photo printer:
Epson Stylus Photo 1280

Pocket PC PDA:
HP iPaq 5450

Palm OS PDA:
Palm Tungsten C

5.1 speakers:
Logitech Z-680

4.1 speakers:
Logitech Z-560

2.1 speakers:
Klipsch Promedia 2.1

The games we're currently playing: *Battlefield 1942: Desert Combat Mod, Rise of Nations, PlanetSide*

Let's Party!

LAN parties are intense gaming competitions in which the quality of your hardware can be the difference between winning and losing. Intrigued? Then check out the latest LAN party equipment developed by the R&D team at Maximum PC Labs.

Doritos 3D IV

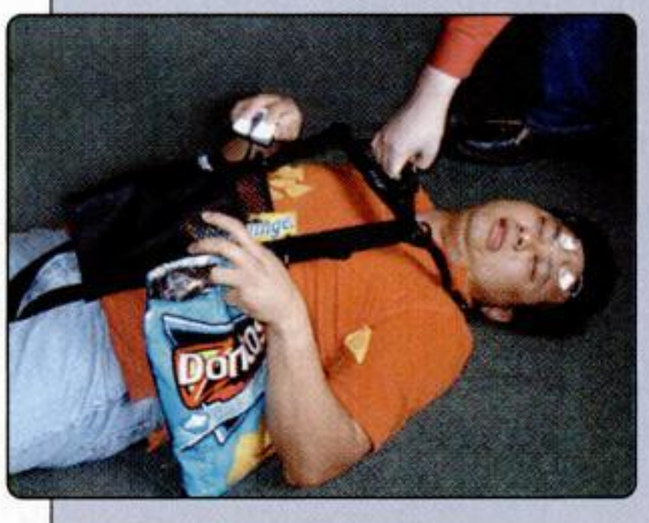
Nothing provides a better mainline for gaming than a large bore of granulated Doritos suspended in either a D5W or Ringer's Lactate solution.

The LAN Potty

When your team is counting on you to take the next objective in *Battlefield 1942,* there's no time for number 1 or 2. Thus the LAN potty, a self-contained, self-sealing chemical water closet that won't spill if toppled during impassioned gameplay. The Deluxe version includes a cold-cathode toilet paper holder.

The GuyGrip

If you've ever seen a friend keel over from exhaustion during a 48-hour marathon, you know just how much of a pain it is to heft him to the car—and then move the damned PC, too. GuyGrip lets you effortlessly move the comatose gamer with one hand, and even has a compartment for the mouse—assuming you can pry it from the gamer's palsied hand. The GuyGrip also comes in an anatomically correct GalGrip version.



Copyrighted material

High Power HellFire 2

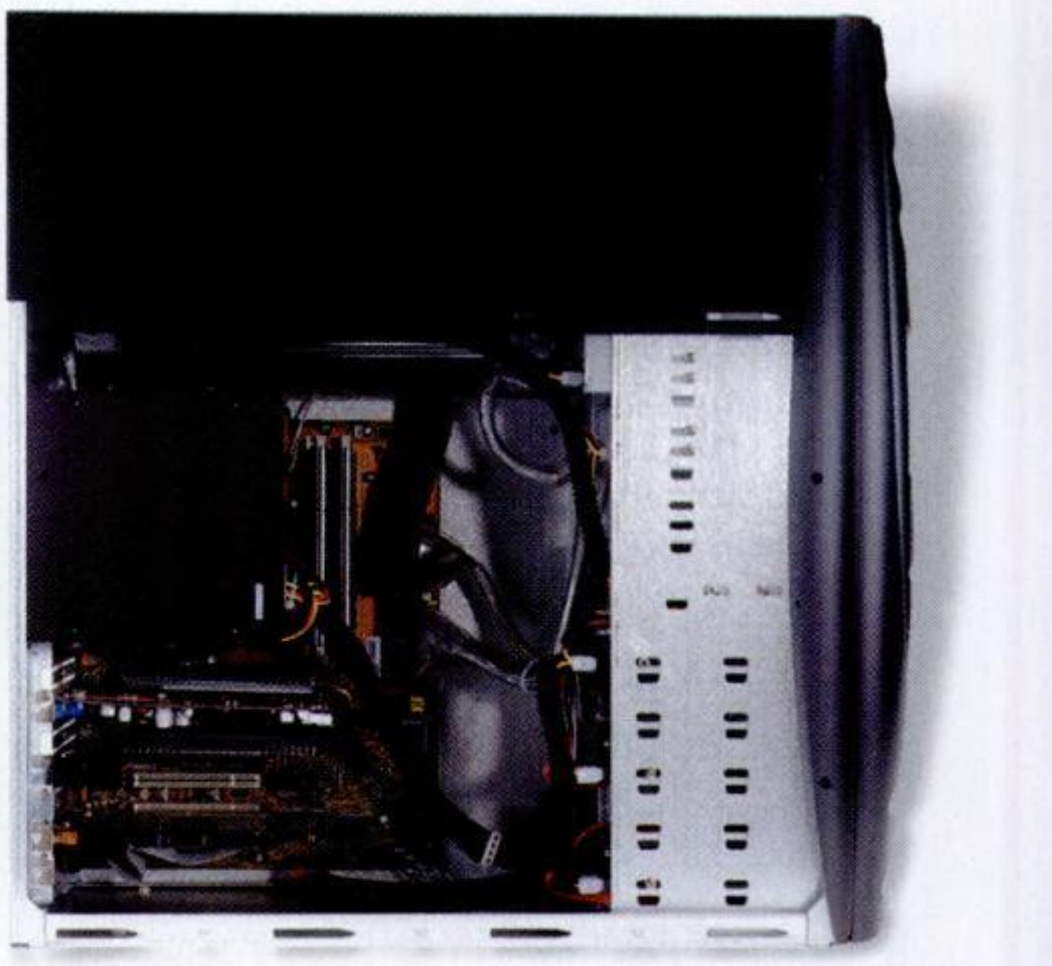
Hell on ice

The HellFire 2 probably won't go over very well in the Flanders household.

We thought hell would freeze over before we saw another box with an Athlon XP processor in the Lab. After all, AMD has suggested that the 3200+ is the last Athlon upgrade. And with 3.2GHz Pentium 4Cs getting so much attention of late, we figured our next AMD box would surely sport a new Athlon 64 proc. Well, it turns out the Athlon XP *is* still relevant—when cooled to high Hades.

The aptly named HellFire 2 integrates an Asetek VapoChill with an AMD 3000+ Athlon XP and an Asus A7N8X Deluxe mobo. Thanks to the VapoChill phase-change system (an AC on steroids), High Power Computers was able to overclock the stock 2.167GHz Athlon XP to 2.43GHz by upping the system bus from 166MHz to 173MHz, and increasing the multiplier from the stock 13x to 14x. Normally, these would be the ingredients of a silicon barbeque, but the VapoChill kept the CPU at a frosty minus-15 Celsius.

The HellFire 2 gives AMD fans a glimpse at what the Athlon XP could've been if AMD had gone for more clock speed instead of pure bus speeds with its 3200+. At 2.43GHz the HellFire 2 actually closes the gap with the 3.2GHz P4C in some benchmarks.



The HellFire 2's phase-change unit is housed in the black rectangular area above the motherboard.

The HellFire 2 is the first Athlon XP we've seen to break the 300 mark in *SYSmark2002*. In our high-quality MP3 encoding test using *MusicMatch*, the HellFire 2 was about 6 percent slower then the Velocity Raptor reviewed on the opposite page. Of course, in Adobe *Premiere 6.01* the HellFire 2 let loose its fury on the P4C—no surprise, really, as we've been watching the Athlon XP stomp the P4A, B, and C for years in this benchmark. The way-overclocked Athlon XP and OC System Level II Radeon 9700 Pro card couldn't match wits with the 9800 Pro/P4C combo, though. In the Game 4 portion of *3DMark2001 SE*, the Velocity Raptor's 9800 Pro card turned in a score about 11 percent faster then the HellFire 2's.

A pair of smoking Western Digital Raptor 10K Serial ATA drives in RAID 0 helps shrink load times, and everyday storage duties are left to a PATA 120GB Western Digital WD1200JB. The system came shipped with the onboard nForce2 audio enabled, yet also includes an Audigy soundcard (though not an Audigy 2, mind you).

There are always reliability concerns with an overclocked system, but the HellFire2 performed admirably. The rig didn't experience any burps during testing, even during the additional stress-tests.

On the downside, the paint job on the fan grills looks amateur, and the case windows popped out when we simply picked up the case. Finally, the machine had a strange hiccup with the USB ports, whereby a connected USB device would pause periodically. High Power suspects the board may have suffered damage during shipping.

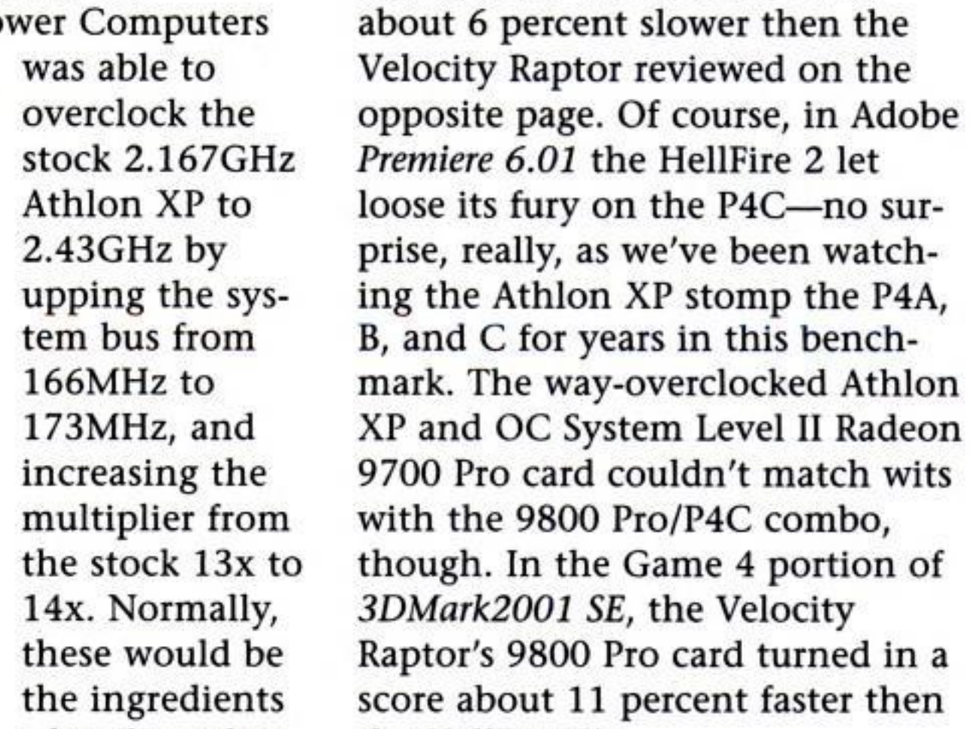
The HellFire 2 isn't for everyone—it's loud and heavy, and its phase-change system sucks a lot of electricity. On the other hand, it's the fastest Athlon XP system we've tested, and almost gives the P4 platform a run for its money.

—GORDON MAH UNG

UNDER THE HOOD

THE BRAINS	
CPU	AMD 3000+ Athlon XP; overclocked from 2.167GHz to 2.43GHz
Mobo	ASUS A7N8X Deluxe using nForce 2 chipset.
RAM	1024MB Corsair Micro DDR400
I/O ports	Two Fast Ethernet, PS/2 mouse, PS/2 keyboard, Parallel, Serial, FireWire A, mic in, line out, three analog outputs, coax SPDIF out
LAN	Onboard 3Com Fast Ethernet and nVidia Fast Ethernet
DISPLAY	
Videocard	OC System Enhanced Radeon 9700 Pro Level II card (400MHz /345MHz)
STORAGE	
Hard drives	One 120GB Western Digital WD1200JB (8MB cache); two 36GB Western Digital WD360 Raptor (10K RPM) in a RAID 0 array (72GB total storage)
DVD-ROM	Lite-On 16x DVD-ROM
CD-RW	Lite-On 52x/24x/52x CD-RW
AUDIO	
Soundcard	Sound Blaster Audigy and nForce2 audio
FINE DETAILS	
Case	Asetek VapoChill
Fans/extras	80mm door fan.
Mouse	Logitech Cordless Freedom Optical
Keyboard	Logitech Cordless Freedom Keyboard
BUNDLE	
Windows XP Professional	
BOOT: 45 sec.*	**DOWN: 32 sec.**

*varies due to phase change system



Our zero-point system includes: an Intel D850MV motherboard, a 2GHz P4 CPU, 512MB PC800 RDRAM, a GeForce4 Ti 4600 videocard, and a Western Digital 1000BB hard drive (2MB cache).

MAXIMUMPC VERDICT

HellFire 2
HIGH POWER COMPUTERS

+ JAMES CAAN
One fast Athlon XP.

– KAHN NOONIAN SINGH
Needs a little more polish, and the configuration is quirky. No DVD burner

www.highpowercomputers.com
$3,285
8

Copyrighted material

Velocity Raptor

They should've called it HAL 3200

With its lights all ablaze, this white beauty looks like a set-piece from *2001: A Space Odyssey*.

When we told Velocity Micro's tech geeks to send us the best machine they had, they didn't mess around. The Raptor Special Edition wraps a beautiful, white mid-tower ATX case around an all-star cast of PC parts: a 52x Plextor CD-RW, a Sony multiformat DVD burner, a Sound Blaster Audigy Platinum eX, and the first Pentium 4C 3.2GHz CPU we've seen in a review system. But what absolutely floored us was the rig's kick-ass storage system. Most vendors expect us to be satisfied with a single Western Digital 2500JB—a 250GB 7200rpm drive with an 8MB cache. But the Raptor augments the requisite 2500JB with a pair of 36GB, 10,000rpm Western Digital Serial ATA Raptor drives in a RAID 0 array. That gives you 72GB of uber-fast storage for Windows and your most critical apps, and another 250GB of space for everything else.

Sporting the fastest stock CPU we've ever tested, and a pair of the world's speediest ATA drives, we expected the Raptor to blast through *SYSmark2003*—and it did. The RAIDed drives helped produce a record *SYSmark* score of 351 (324 being the previous best). The 3.2GHz P4 also pushed the *MusicMatch Jukebox* score to 140 seconds, which is bested by only the overclocked—and superunstable—OC System PC we reviewed in June. In an impromptu, real-world disk test, the Raptor's RAID array loaded the *Battlefield 1942* Market Garden map in 18 seconds, almost 12 seconds faster than a similarly configured rig.

The Raptor uses a standard Zalman copper CPU heatsink complete with a shroud.

Feature-wise, the Raptor is the best-equipped system we've tested in a long time. The external breakout box for the Audigy gives you all the audio inputs and outputs you could possibly need, unless you plan on running a home recording studio. The Raptor sports our two favorite optical drives: the Sony DWU10A DVD+RW/DVD-RW and the Plextor Premium 52x CD-RW. The 256MB Radeon 9800 Pro that shipped with the system runs neck-and-neck with the GeForce FX 5900 Ultra (and if this seems counter to last month's card reviews, see page 58). The case even comes tricked out with a slick paint job, an expansive window, three cold-cathode lights, and a fanbus/temperature readout embedded in the front bezel. Given the Raptor's sci-fi aesthetic, we wouldn't be at all surprised to hear it calmly intone: "I'm sorry, Dave, I'm afraid I can't do that" when an attempt is made to power-off.

A Zalman copper heatsink with a shroud oversees the slightly overclocked CPU, a Buss-Cool PCI slot fan chills the Radeon, and a pair of smart fans in the Antec 480W power supply keeps those temps in check. You'll also find a 120mm cold-cathode fan cooling the hard drives, and a variable-speed fan (itself black-light cold-cathode) dispensing a breeze near the PSU. If all that still leaves you wanting, the speed of the rear exhaust fan can be easily increased via the fanbus on the case's front bezel.

The Raptor seals the deal with an exquisite wiring job. A neatly wired Serial ATA RAID array might be a routine feat, but the all-around tight wiring of the 2500JB and the optical drives—using traditional ATA ribbon cables, no less—is noteworthy.

The Raptor can only be taken to task for its price. A rig that costs almost 5K should kick the very lifeblood out of any other PC we've even *looked* at, but in truth, the performance difference between the Raptor's 3.2GHz and its competitors' 3GHz P4s is akin to a love tap.

—WILL SMITH

UNDER THE HOOD

THE BRAINS	
CPU	Intel 3.2GHz Pentium 4C @3.26GHz
Mobo	Intel D875PBZ (800MHz bus)
RAM	1024MB Corsair DDR433 (CL2)
I/O ports	Eight USB 2.0, serial, parallel, two FireWire, mic, three line-in, three analog out, one coax digital in/out, one Toslink digital in/out, one Toslink digital in, MIDI in/out, headphone
LAN	Intel Pro/1000 Gigabit Ethernet on CSA port
DISPLAY	
Videocard	ATI Radeon 9800 Pro 256MB (380MHz/350MHz)
STORAGE	
Hard drives	One 250GB Western Digital WD2500JB (8MB cache), two 36GB Western Digital WD360 Raptor (10K RPM) in a RAID 0 array (72GB total storage)
DVD-ROM	Sony DWU10A DVD+RW/DVD-RW
CD-RW	Plextor Premium 52x/32x/52x CD-RW
AUDIO	
Soundcard	Sound Blaster Audigy 2 Platinum eX w/ external drive
FINE DETAILS	
Case	DX-W
Fans/extras	One 80mm fan, one 120mm fan, case window, three cold cathode lights, front-mounted temperature gauge w/ three probes, Buss-Cool PCI slot fan
Mouse	Microsoft Intellimouse Explorer 3.0A USB
Keyboard	Microsoft Internet Keyboard
BUNDLE	
Windows XP Professional	
BOOT: 48 sec	**DOWN: 11 sec**

Our zero-point system includes: an Intel D850MV motherboard, a 2GHz P4 CPU, 512MB PC800 RDRAM, a GeForce4 Ti 4600 videocard, and a Western Digital 1000BB hard drive (2MB cache).

MAXIMUMPC VERDICT

Raptor Special Edition
VELOCITY MICRO

+ 2001: A SPACE ODYSSEY

Top-dog performance, a Kubrickian case design, and cutting-edge components.

– 2010: A SPACE TRAVESTY

Forty-six hundred dollars and it doesn't even include a HAL-esque light on the front?!

www. velocitymicro.com
$4,640
9

Copyrighted material

Lil' Hardware Hoedown

Wee wireless adapters, a teeny-tiny digicam, and a kit for lighting up your case

SiPix StyleCam Blink II

When the call came in, the Blink II was described as a fully functional digital camera about the size of a box of matches. Sounds great, but we've seen some pretty large matchboxes in our day. Are we talking about a big 500-count box of strike-anywhere matches, or are we talking about a sleek, tiny box that one might pick up from the hostess station of a fancy restaurant? The SiPix lady said, "Think fancy."

The Blink II is indeed the tiniest digital camera we have *ever* reviewed—the first one that we can throw in a flimsy front shirt pocket without feeling weighed down. With 8MB of non-expandable memory, the little'n can hold 70 images at 640x480, and 300 at 320x240. Focus is fixed, and white balance and exposure are automatic. There's no onboard flash. Image quality? Sucky. Really bad, with tons of noise and blurriness unless you can snap a shot under the absolute best lighting conditions. And even if you nail your shot, image quality is still laughable. That's what you get with a cheap CMOS image sensor, but this camera is just a novelty, so who cares? It's the smallest digicam we've ever used! You can easily find it online for less than $40, so why not buy it just for giggles? It's small!

—JON PHILLIPS

MAXIMUM PC VERDICT: 6

$40, www.sipixdigital.com

Linksys Wireless Compact USB Adapter

The Linksys Wireless Compact USB Adapter is like a pollinating bee that flits from flower to flower, only the flowers are USB ports, and the pollen is wireless network connectivity. As the name implies, the adapter plugs into a PC's free USB 1.0 port to achieve an 802.11b Wi-Fi connection.

The USB Adapter is handy and portable, looking like a hefty pen, complete with a "cap" that protects the USB connection. An included neck cord can be affixed to the cap for even more effortless transport.

Using the device is easy enough. Once driver installation is complete, you simply plug the adapter into a USB port, raise its antenna tail, and enjoy the consistently good (but never great) wireless link quality. It worked well most times on most systems we tested. To avoid the potential for RF interference from a host computer, use the included USB extension to increase the distance between the adapter and the computer.

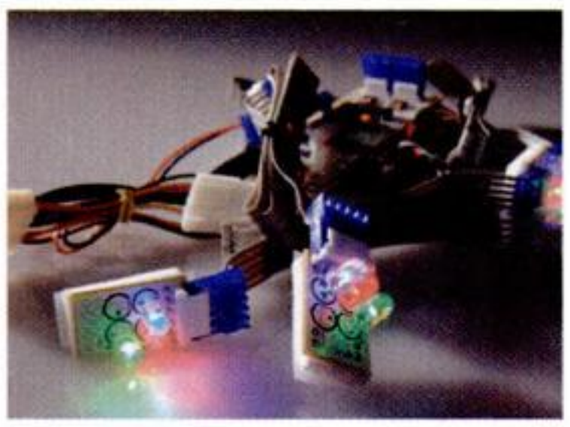
We occasionally experienced problems with the network connectivity just dropping out and requiring a reboot, but were unable to consistently duplicate the outage in order to pinpoint its cause. Our hunch is that it was a heat issue, or it could have been the result of incompatibility with the laptop's USB implementation.

—ROBERT PALMER MOSELEY

MAXIMUM PC VERDICT: 7

$72, www.linksys.com

MADLights LED Lighting Kit



In recent months, we've seen an avalanche of lighting options designed to enliven the inner sanctums of home-built rigs. You can choose from among cold cathodes, black lights, and high-intensity LEDs, as well as more conventional modes of illumination. Then you have your extreme gimmicks, like the MADLights kit, which consists of four LED modules, each with three colored LEDs (red, green, and blue), and a small PCB to control them. These lights don't just shine—they flash to preset rhythms like the syncopated lasers of a Pink Floyd concert.

Neat Molex connectors handle all your hook-ups. The kit offers 16 "light show" programs, and two remote buttons allow you to select a program and its speed. We found the high-intensity LEDs to run bright and cool (and coolness is imperative in PC enclosures). The pre-programmed animations offer a nice variety, but documentation for the kit is spotty. Mounting hardware is rudimentary at best, consisting of simple Perspex pieces with double-sided tape attached. Overall, this isn't a bad lighting kit, but at $60, the price seems a bit high considering that basic cold-cathode and high-intensity LED arrangements can be had for as little as $10.

—DWIGHT LOOI

MAXIMUM PC VERDICT: 7

$60, www.madlights.com

D-Link Air 660W Wireless Adapter

MAXIMUM PC KICK ASS PRODUCT

Running a Pocket PC with a wireless network card is as refreshing as a cool breeze to a kilt-clad Scottish Highlander—or so we would imagine. The D-Link 660W Wireless Adapter not only liberates you from the confines of cables and cords, its rock-solid reliability allows you to wander about freely without worrying about your connection. After the CompactFlash card is installed and configured (make sure you're using the latest version of *ActiveSync*), you simply access your specific AP or ad-hoc network, and you're solidly connected. The 660W was consistently able to achieve signal strengths and qualities that measured between 90 and 100 percent in the Windows Control Panel, even in instances when a Dell Inspiron 8200 internal Wi-Fi NIC mustered just a 20 to 30 percent readout. This is an admirable feat for the smaller, lower-powered D-Link device. However, once its connection began depreciating, it was essentially useless.

While the card itself is everything you'd need for Pocket PC Wi-Fi, the software makes it truly stand out. The latest version of the drivers (get it!) allows you to create connection profiles for each distinct connection, so you can move from one access point to another by selecting the appropriate profile, instead of reconfiguring each connection anew. The bundled *SiteSurvey* is also cool. A bar graph represents each wireless channel and measures its signal strength to make scanning for a connection exceedingly easy.

—ROBERT PALMER MOSELEY

MAXIMUM PC VERDICT: 9

$100, www.dlink.com

Copyrighted material

TDK indiDVD Dual-Format DVD Burner

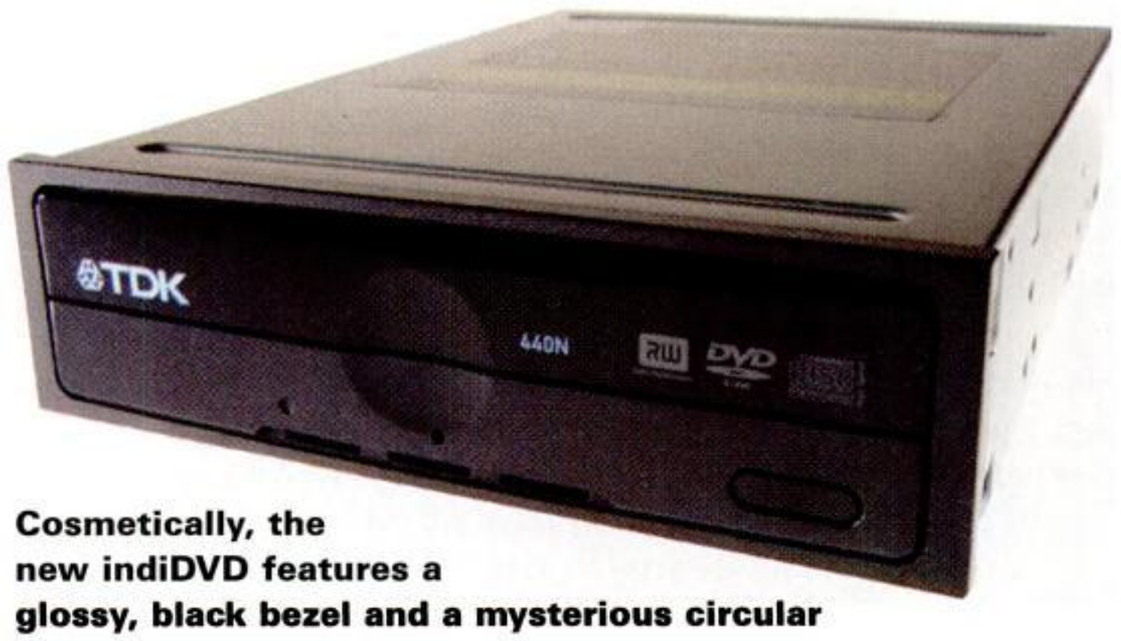
Son of indiDVD

We just reviewed TDK's DVD+R/W burner in May 2003, so what's so special about this follow-up? Dual formats, that's what. By now, you're probably aware of the pain and heartbreak that comes from buying a $300 single-format DVD burner whose discs won't play in just any set-top player or DVD-ROM. If you have a dual-format drive that can burn to all four kinds of discs like the indiDVD can, you're virtually guaranteed success, though you'll have to experiment some with different formats and DVD readers.

The specs are similar to those of the single-format drive, with a bit of polish. The fastest recordable DVD format available on the indiDVD (or any current DVD burner, for that matter) is 4x DVD+R, which produces a 4.25GB data disc in 13:57 (min:sec). That's followed by 4x DVD-R, which does the same thing in 14:01. The next fastest format, 2.4 DVD+RW, clocks in at 22:39, and DVD-RW brings up the rear at 28:13. CPU utilization is lower than with the original indiDVD, moving from a whopping 21 percent to a more reasonable 13 percent, and making the burner significantly less burdensome on slower machines. Audio extraction remains the bugaboo of TDK's DVD burners—reading the outer extremities of our 70-minute-plus CD taxed the drive, causing it to slow way down and turn in a humdrum rip time of 4:27, more than a minute longer than the single-format indiDVD.

BENCHMARKS	DVD-R	CD
Average data transfer (MB/sec)	9.8	5.9
Random/full-stroke seek (ms)	115/189	112/176
Audio extraction (min:sec)	-	4:27
Data burn (min:sec)	13:57	5:29
CPU utilization	13% (2x)	6% (8x)

The data CD burn test uses the bundled applications to create a 700MB CD-R. The data DVD burn test uses the bundled applications to create a 4.25GB. The audio-extraction test uses a commercially stamped 70:07 minute audio CD. All tests were performed using Verbatim media, except where noted.



Cosmetically, the new indiDVD features a glossy, black bezel and a mysterious circular indentation.

The indiDVD comes with the usual top-quality documentation we've come to expect from TDK. We would've preferred *Sonic's MyDVD* 4.0 over Roxio's *DVD Builder*, but the latter is still an acceptable app for starters. The 10 percent premium you pay for a dual-format drive will seem like a bargain if it's compatibility you're after. We think Sony's DRU-500A is a slightly better buy with 24x CD-R writing and superior digital-audio extraction, but it's also scarce, and we're not fans of the hard-to-get.

—LOGAN DECKER

⊕ **ROXIE ROKER:** The dual-format burner is the only solution for the dual-format wars.

⊖ **MARTHA'S BROKER:** Audio extraction still suffers in this drive, and we'd prefer higher-quality software titles.

MAXIMUM PC VERDICT: 9

$330, www.tdk.com

Bantam BA800 MP3 Player/Image Viewer

It came from outer space

Early this year a Santa Cruz teenager was hanging out in her room when a basketball-size clump of blue ice came crashing through the ceiling (landing on her favorite sweatshirt, no less). Neither she nor her family could figure out what it was or where it came from.

We were reminded of this enigmatic incident when Bantam's BA800 landed in the Lab. Big, bulbous, and pulsing with color on both sides, we didn't know what to make of it. Well, we know now. It's a 256MB solid-state MP3 player with a couple arguably cool features. Unfortunately, they're not features we're looking for in an MP3 player.

We praised Bantam's Kick-Ass BA350 for being the smallest 128MB MP3 player at the time (February 2002). Bantam gets no praise this time around for being the biggest solid-state player we've seen. It's roughly the size and shape of a tangerine that's been stepped on. It's much too big to fit comfortably in a pocket, yet it doesn't come with a belt clip, carrying case, or duffel bag.

Unique for a solid-state player, the BA800 sports a color LCD viewscreen. For watching video? No, for displaying pictures. *Dullsville*. The screen supports JPEG, BMP, GIF, and TIFF files. What clod would eat up precious memory loading a TIFF file onto the player? And as battery life dwindled—after about eight hours or so—the screen began to freak out, turning the image into fading horizontal lines.

Another questionable value-add is the BA800's "CoolLights" technology. Two milky-white panels on either side of the player will illuminate with color at the push of a button. You can choose a single color from the 256 available shades, or have the player transition from one color to the next, but unless you're in an extremely dark room, and under the influence of a narcotic, the effect is less than spectacular.

If you have a hard time seeing the "CoolLights" effect, that's because it works best in a dark closet with duct tape covering all the gaps around the door.

Even though 256MB of internal memory is generous for a solid-state player (with an SD slot for expansion), it seems like your $300 would be much better spent on 20GB of storage from Creative Labs' Nomad Jukebox 3 or Nomad Jukebox Zen, or a 10GB iPod with the updated design.

In case you were wondering, that airborne chunk of ice was the "discard" from an airplane loo. That must have been a disappointing revelation after such a compelling mystery. We know the feeling.

—LOGAN DECKER

⊕ **UFOs:** 256MB is a nice helping of internal memory for a solid-state player, and it's true that our current MP3 players can't display color pictures.

⊖ **HMOs:** Our current MP3 players don't paint our toenails, either—we don't need them to. Plus, this puppy is huge.

MAXIMUM PC VERDICT: 5

$300, www.bantamusa.com

Copyrighted material

Palm Tungsten C

New Palm touts Wi-Fi, keyboard, and loads of RAM

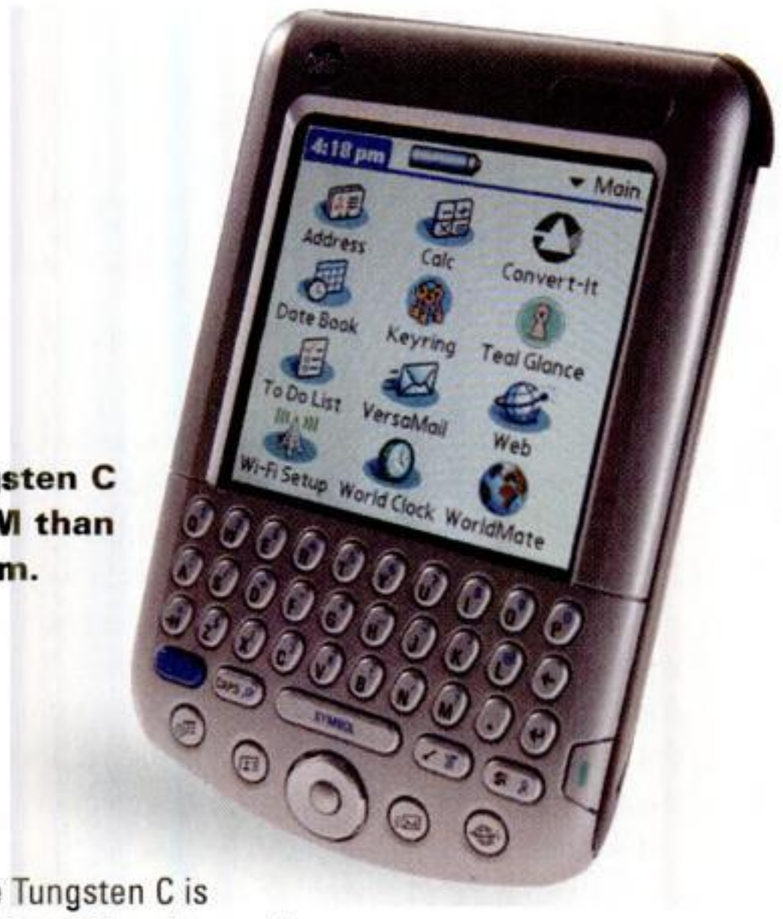
The Palm Tungsten T that we reviewed in January marked such a revolutionary leap in the Palm product line, we figured the company had finally awoken from a long, deep slumber. Palm's new Tungsten C only adds credence to that theory. Those who have seen its predecessor the Tungsten W will recognize the shell. Inside, however, the Tungsten C is a thoroughly retooled unit: New are a 400MHz Intel XScale CPU, a 16-bit transflective screen capable of a 320x320 resolution, Wi-Fi support, a fat 1500mAh battery, and 64MB of RAM—the most onboard memory we've ever seen in a Palm OS-based unit.

MAXIMUM PC KICK ASS PRODUCT

Palm is clearly aiming the Tungsten C at business users who inhabit Wi-Fi-ready environments. Tungsten W's GSM/GPRS network obviously has its merits, but getting the Internet on a PDA without paying the GSM/GPRS subscription price is awfully attractive.

Palm brags that its Wi-Fi is capable of outlasting that of Pocket PC units running stock batteries, and we'd have to agree. While most Pocket PC units give you an hour or two of web browsing, the Tungsten C's 1500mAh battery let us browse the web and check e-mail for more than five hours. The Tungsten C comes with *Versamail 2.5,* which supports both POP and IMAP e-mail. The client is fairly feature-rich and easy to use. We were even more enamored with the bundled *Web Browser 2.0.* Considering Microsoft's browser dominance, you might expect *Pocket Internet Explorer* to be the superior product, but we actually found Palm's *Web Browser 2.0* to be far more robust.

The Tungsten C features Graffiti 2 which is based on CiC's Jot. For old-school Palm users, the transition from the original Graffiti is a little difficult, but by no means impossible. (No, Palm didn't make the switch just to annoy people—it lost a lawsuit that forced the change.)



The new Tungsten C has more RAM than any other Palm.

Oddly, while the Tungsten C is jam-packed with a fat CPU and tons of RAM, there's no onboard mic for recording, no built-in media player, and the speaker is tinny at best. In other words, the Tungsten C is all work and no play.

It may seem inexcusable for a $500 PDA to lack strong multimedia skills, but we think it's actually an acceptable trade-off for the long-running Wi-Fi, sophisticated browser, and beucoup memory. Sure, Palm could stand to make some improvements, but the Tungsten C may be good enough to keep folks from switching to Pocket PC.

—GORDON MAH UNG

PALM TREES: Awesome battery life even when using Wi-Fi.
HAIRY PALMS: A little hefty, and lacks a microphone and quality onboard speaker.

MAXIMUM PC VERDICT: 9

$500, www.palm.com

Palm Zire 71

New Palm packs a hidden camera

If the Tungsten C is all about work, then the Zire 71 is its polar opposite. Without compromise to its svelte and stylish appearance, Palm manages to jam a hidden camera into the Zire 71, making the new PDA a kick to use.

Palm isn't the first on the block with a camera-equipped PDA. Sony has long offered a camera in its Palm OS-based handhelds. But the Zire 71's reasonable $300 price could easily make someone think twice before purchasing Sony's $800 NZ90. Of course, that savings comes at a cost: Sony's NZ90 is capable of 2-megapixel resolution and comes with a built-in flash, while the Zire 71 captures just 640x480 images and is flashless.

Despite a dearth of serious digital-imaging features, the Zire 71 is loads of fun. The fixed focal-length lens produces consistently satisfying results in daylight conditions and well-lit indoor environments, thanks to a speedy F/2.8 aperture. To take pictures, the body of the Zire slides partially out of its metallic backing to expose a lens on the body's backside; the PDA's screen becomes a viewfinder.

Under the hood, the Zire houses a 144MHz OMAP310 CPU that's more than sufficient for basic media chores. We also like the small joystick for navigation, although we think heavy gaming may see it snap off. The screen uses the same brilliant transflective display as the big Tungsten C. And in a thoughtful move by Palm, the Zire comes outfitted with built-in media software that lets you play MP3 and other audio files from the get-go.

The Zire slides up to reveal a low-res CMOS camera. You can store your images in onboard RAM or on an SDIO memory card.

Higher-res images would certainly make for a stronger package, as would base RAM greater than 16MB. But overall, the Zire 71 recaptures some of the fun we had when the original Palm Pilots walked the earth—and that's no easy task.

—GORDON MAH UNG

TRI-X: The light weight of the unit makes it easy to carry this camera-equipped PDA everywhere.
T-MAX: More base RAM would be welcome, and we'd like true multitasking in the OS.

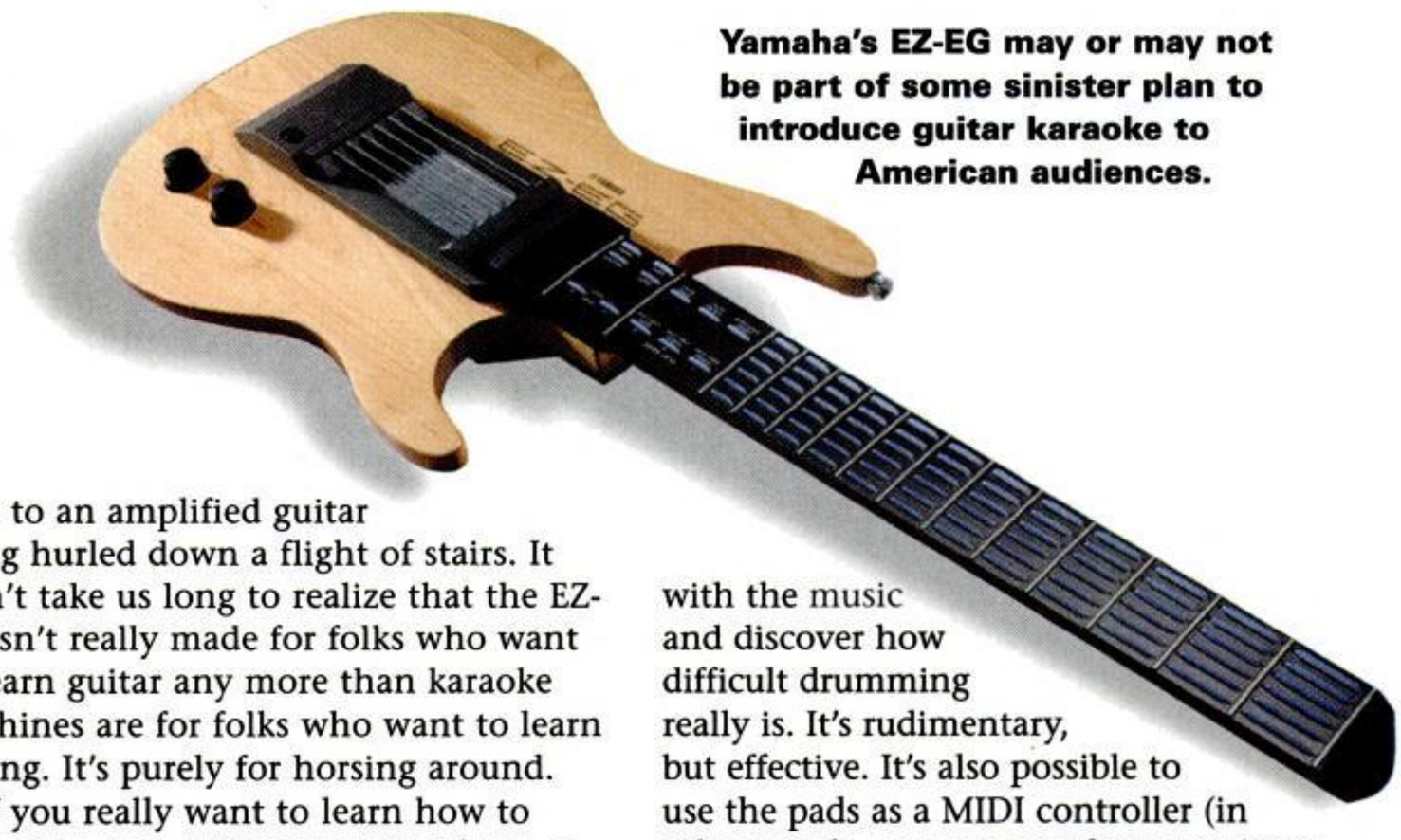
MAXIMUM PC VERDICT: 9

$300, www.palm.com

Copyrighted material

Music Lessons the Maximum PC Way

Making joyful noise unto the Lab



Yamaha's EZ-EG may or may not be part of some sinister plan to introduce guitar karaoke to American audiences.

Unless you're extraordinarily good-looking or married to a music executive, if you want to break into the music business, chances are you're going to have to learn to play an instrument. Yes, we know—how *dull*. Well, don't fret. We've got not one, but *two* new electronic instruments that can help you make music without the years of tedious lessons.

—LOGAN DECKER

Yamaha's EZ-EG

Everybody wants to be the guitarist. Think about it: We all know who Kurt Cobain is, but what's the name of the bassist? Indeed, the excitement was palpable when we received the EZ Guitar and imagined ourselves blowing the roof off the Lab with our nasty licks.

But by the time we'd unboxed the device, our excitement had waned considerably. About four-fifths the size of a standard electric guitar, the EZ-EG otherwise bears little similarity to the real deal. Instead of strings, a series of buttons are distributed between the frets for chording. Strumming takes place in the belly across extremely thick, rigid metal wires—imagine strumming on exceptionally thick paper clips. The guitar is self-amplified, and your strumming and the canned musical accompaniment wheeze out of a small speaker in the guitar's body.

There are three ways to attack the 18 bundled songs (more are downloadable from Yamaha's site via a USB cable). "Chord" mode lights up the buttons on the fretboard, indicating which ones should be depressed to make the appropriate chords as the song plays. The song pauses on notes until you've fingered the correct chord, and resumes when you've got it. "Strum" mode plays the song nonstop, lighting up the chords while you struggle to keep apace with a steady rhythm and fingering. The supremely confident can attempt the mode that combines chord fingering *and* strumming.

Even at slow tempos, the auditory result of playing along with the EZ-EG is akin to an amplified guitar being hurled down a flight of stairs. It didn't take us long to realize that the EZ-EG isn't really made for folks who want to learn guitar any more than karaoke machines are for folks who want to learn to sing. It's purely for horsing around.

If you really want to learn how to play, get a real guitar at a pawnshop, or try Yamaha's slick but expensive Silent Guitar ($700, **www.yamaha.com/guitars**) featured in our December 2002 gift guide.

PLATINUM RECORD: The EZ-EG's illuminated fretboard can teach you the chords to play "Day Tripper."

PROTECTED CD: Don't expect it to help you play them well.

MAXIMUM PC VERDICT: 5

$300, www.yamaha.com

Bafo SoulDrum

The aspiring drummer in the family is every parent's nightmare. The only thing worse than having to endure someone's banging away on a drum kit is having to endure someone doing it badly. Bafo Technologies may be able to help on both counts.

It's called the SoulDrum, and it consists of a compact arrangement of five pressure-sensitive percussion pads attached to a 4-foot-high drum stand, a kick treadle, a box that routes the signals to your PC via the USB port, and, of course, drumsticks. Don't take fright at all the parts—we set the whole thing up with a screwdriver in less than 10 minutes. The software loads drum samples (recordings of actual drums and synthesized sounds) onto your hard drive that you select and assign to the various pads. Then it's up to you to jam to your heart's content, causing only a fraction of the aggravation a real drum kit would provoke.

The program disc includes three *awful* training videos that we suggest you ignore. The real training application is the one called, elegantly enough, "game." With 10 songs and four levels of difficulty, you're challenged to keep time with the music and discover how difficult drumming really is. It's rudimentary, but effective. It's also possible to use the pads as a MIDI controller (in other words, you can use them to trigger your own samples or SoundFonts), but there seems to be, oh, just about four or five levels of pressure sensitivity, so don't expect too much expressiveness.

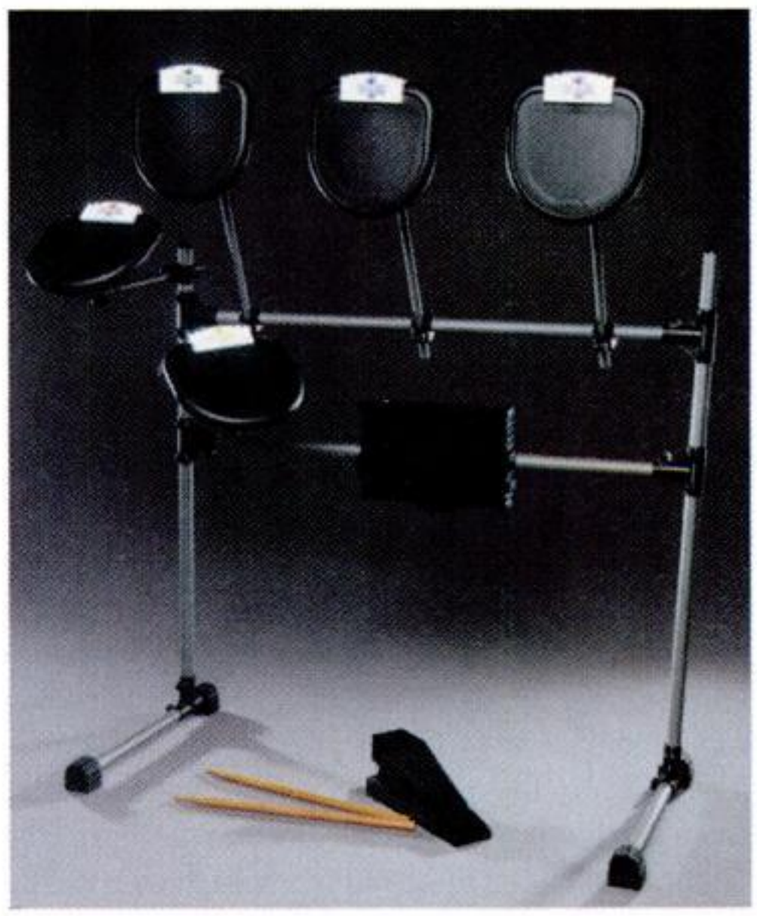
Still, it's fun, cheap, and constructive. It can even be easily collapsed for transport. But then, isn't that what roadies are for?

DRUMS: Bafo's SoulDrum has the potential to teach even uncoordinated boobs like ourselves some rhythm.

BUMS: It's inexpensive, and it shows. The pads are made of rigid plastic, and there are very few levels of pressure-sensitivity.

MAXIMUM PC VERDICT: 7

$300, www.bafo.com



While the "soul" isn't included, the electronic percussion pads do the drum part fairly well.

Reproduced material

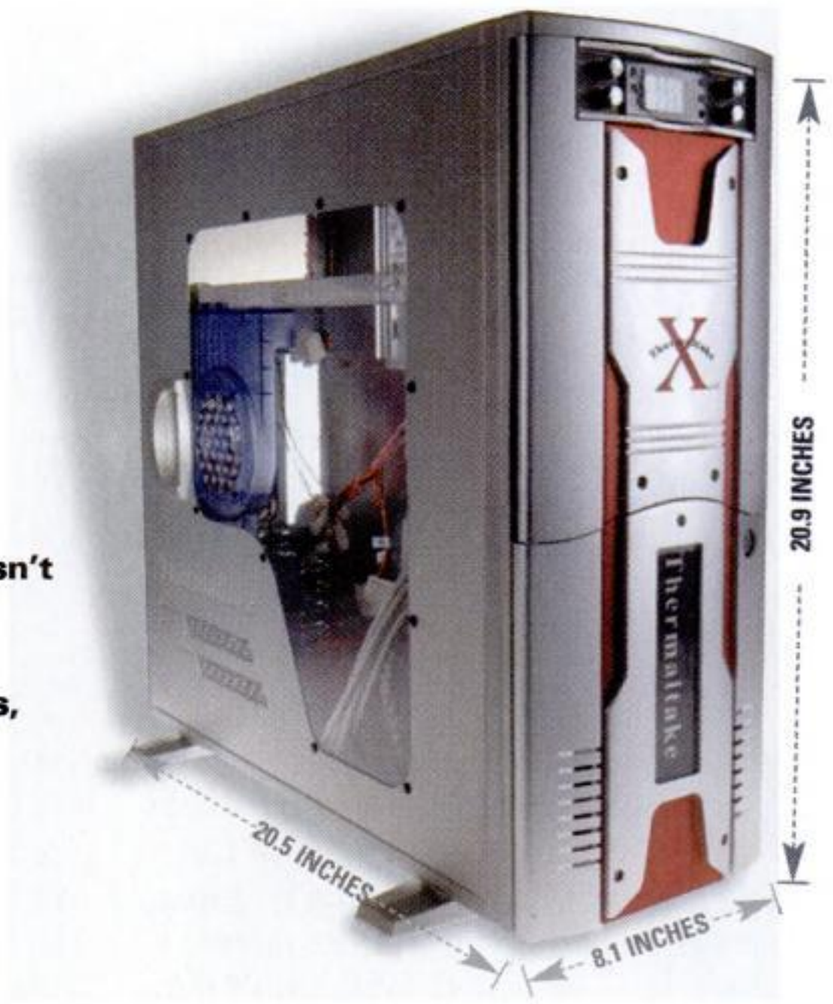
Thermaltake Xaser III

Mucho case for the moolah

The proliferation of fans—and their incessant humming—may be an abomination to some case aficionados, but for others, the whirring racket is just an integral part of hardcore hardware hacking. For these extreme upgraders, Thermaltake offers the Xaser III, which offers no fewer than *seven* 80mm fans.

There are two intake fans in the front to cool your hard drives, two intakes on the side to keep air moving across add-in cards, and two outward-blowing fans in the rear to vent hot air emanating from the CPU. The seventh chopper fits into a top blowhole just behind a top-mounted I/O panel with two USB ports, a FireWire port, and audio I/O jacks. The four intake fans are outfitted with washable filters to keep dust out—always a nice touch. And to top it all off, the Xaser III has an integrated baybus featuring four knobs for fan-speed adjustment (each knob controls two fans, which can be turned up or down in a continuous fashion). Via an integrated LCD display on the baybus, you can precisely monitor interior temperatures, and the system will even trip an alarm should the interior overheat. When the fans are turned all the way down, noise levels are comfortably low.

Construction is all-aluminum except for a few minor plastic parts, and the side window is optional. There are four 5.25-inch and two 3.5-inch front accessible bays, as well as an additional six internal 3.5-inch bays. A familiar rail system is ready for drive mounting, and Thermaltake includes internal storage racks for unused rails, so they won't be misplaced. We also like the clever front door lock. Turn the key in one direction, and you lock the entire front. A second direction lets you swing only the bay door open. A third setting lets you swing open the entire front assembly to remove drives and change filters. There's also an "intrusion switch" that can warn you when someone tries to get to your rig's insides. This feature requires mobo and BIOS support, but once you have it activated, you'll know as soon as you boot whether someone's been messing with your PC.



The Xaser III isn't just flash. It's packed with useful features, too.

With its silver-painted plastic parts and electroluminescent Thermaltake badge, you could argue that the Xaser III is downright tacky. But if you're into its looks, and fans are of utmost importance, this is your case. We would never call a $198 enclosure "low cost," but the Xaser III is a lot of case for the money.

—DWIGHT LOOI

ION ENGINES: Solid construction, feature-laden, tons of fans.
SATURN ION: Design may appear tawdry to some, and it's got enough fans to drive Steve Jobs insane.

MAXIMUM PC VERDICT: 9

$198, www.thermaltake.com

---

iBuyPower RaidCom

Drive bays for days

If you find yourself longing for the days when a power user's pedigree could be measured by the number of drive bays in his rig, the RaidCom case is for you. Featuring no fewer than eight front-mounted 5.25-inch drive bays, the RaidCom has ample room for optical drives, baybus controllers, temperature displays, and whatever else you can shove into its gullet.

Made entirely of aluminum, the RaidCom is lighter than its appearance may suggest—light enough, in fact, to make us wonder about its long-term durability. Nonetheless, the case was able to withstand the sitting weight of a full-grown editor without folding up like a soda can. The case door features a clear-plastic window and two integrated exhaust fans. Both side panels are hinged and swing open. To access the innards, you need only flip open the two strips of aluminum that flank the front facade, undo four thumb screws (two per side), and then swing open the side panels.

Although compact, the interior is sufficiently roomy and free of obstructions. While the multi-bay case is a dream come true for people who are way into optical drives, hard drive installation is less care-free, requiring the use of 3.5-inch drive adapters (three sets of adapters came included with the case). The upside to the drive-adapter solution is the room it creates between hot-running hard drives and neighboring devices. That combined with the airflow from the perforated drive bay covers is welcome protection against overheating.

Overall, the RaidCom is an admirable effort. It may not have the exquisite fit and finish of other, more expensive cases, but it's certainly adequate for anyone other than the demanding connoisseur.

If you have the need for eight optical drives, the RaidCom case can handle it.

We're told that iBuyPower.com is the sole distributor of the case; it can be purchased bare or with a power supply, and you can choose between a silver, black, blue, green, or yellow painted finish (though the paint is not of the highest quality). A cold cathode light costs an additional $10.

—DWIGHT LOOI

KGB: Affordable, good airflow for internal components, conveniently located power and reset switches.
SVR: A little flimsy, and sub-par paint job.

MAXIMUM PC VERDICT: 7

$125, (no power supply or lighting kit), www.ibuypower.com

Copyrighted material

Archos AV320 Movie/MP3 Player

The Swiss-Army knife of portable video

Would you like that movie for here or to *Ghost World*?

Stuck in an endless airport-security line? No problem—thanks to the Archos 20GB AV320 portable video/MP3 player, the waiting game can be fun. That's right—music *and* movies on the go. As many as you can stuff into the internal 20GB drive (the AV340 offers a 40GB drive).

The AV320 supports files encoded in DivX or Xvid formats (subsets of MPEG-4, which is covered this month in our Quick Start section). The player comes with easy-to-use software for converting AVI and MPEG files to these formats, but we had to download the DivX and Xvid codecs (which really should've been included on the disc). Files compressed using these codecs look surprisingly sharp on the AV320's 3.8-inch screen, though a minor mosaic effect obscures some details, particularly in dark areas. It's possible to improve the image quality, but only if you're familiar with the options offered in the bundled *Virtual Dub* encoding app—and they are somewhat difficult to master. Battery life for movie playback clocked in at just more than three hours, enough for two average movies or one epic.

No special uploading software is necessary—just drag and drop your media files onto the player, which shows up as a removable drive in Explorer. A proprietary connector allows you to snap in the Digital Video Recorder to record directly to the device from component and S-video inputs. This means you can record television shows and video directly to the AV320 for viewing later (but beware of Macrovision—this popular form of copy-protection will prevent you from getting good image quality from protected VHS and DVD media). Another included dongle allows you to output to an external display using the same connections. This proprietary jack is actually the gateway to a staggering list of optional components available from Archos—including a 3.3 megapixel camera, an FM radio receiver, and a memory card reader.

Encoding and recording videos for playback might take a bit of concentration for beginners, but navigation of files within the player is utterly painless. A small joystick to the left of the screen allows you to select between the various functional modes (audio recording, configuration, etc.) or your media folders (photos, music, video, voice). What appears in your media folders is whatever you drag into them from within Explorer. So if you copy, for example, a folder named "Movie Soundtracks" that contains five nested folders of five different soundtracks, each with two nested folders containing the full soundtrack encoded at two different bitrates, that's the exact same file structure you'll see in the Archos. You can still put video files in the music folder, or vice versa. The folders are just there to aid navigation, and don't force you to do anything in a way that's unfamiliar. It's simple, familiar, and effective.

There are five other buttons on the face of the Archos that represent functions such as pause, select, back, and so forth. They take some memorization, but aren't awkward to deal with once you've used them for a day or two.

As enjoyable as the AV320 is, there are a few things that ought to give you pause before you "click to purchase." The viewing angle of the 640x480 max-res screen is *very* limited. The image quality plunges if you're not looking directly at the screen, and without an adjustable stand to prop up the device, the player must be cradled in your hands to get the best picture. The Li-Ion battery is built in, so you can't simply swap it for another if your charge runs out. The AV320 doesn't support DivX or Xvid files encoded with variable bitrate audio (as opposed to constant bitrate). And while downloading the proper codecs and encoding your own movies isn't difficult, it's a process that's sure to confound the average Joe.

But you're not the average Joe, are you? The AV320 is a power-user's dream gadget. It's got roomy storage, a crisp screen, fits comfortably into a jacket pocket, and seems almost endlessly extendible with snap-ons from Archos. And we *love* that Archos doesn't force you to use special software or drivers to upload your media to the device. As long as you've got the Archos AV320 multimedia player, you can endure any wait in line. Until the batteries run out, that is. Then you're on your own, so plan accordingly.

—LOGAN DECKER

MAXIMUMPC VERDICT

AV320
ARCHOS

+ PORTABLE VIDEO

No doubt about it—the versatile AV320 is the sexiest gadget in the neighborhood. Movies on the go are the Next Big Thing.

– DIRECT-TO-VIDEO

Wildly expensive. Teeny viewable angle. Our own DivX files still needed to be re-encoded by the bundled software before they would play on the AV320.

www.archos.com
$600 (with digital video recorder)

8

Copyrighted material

Snapstream PVS3

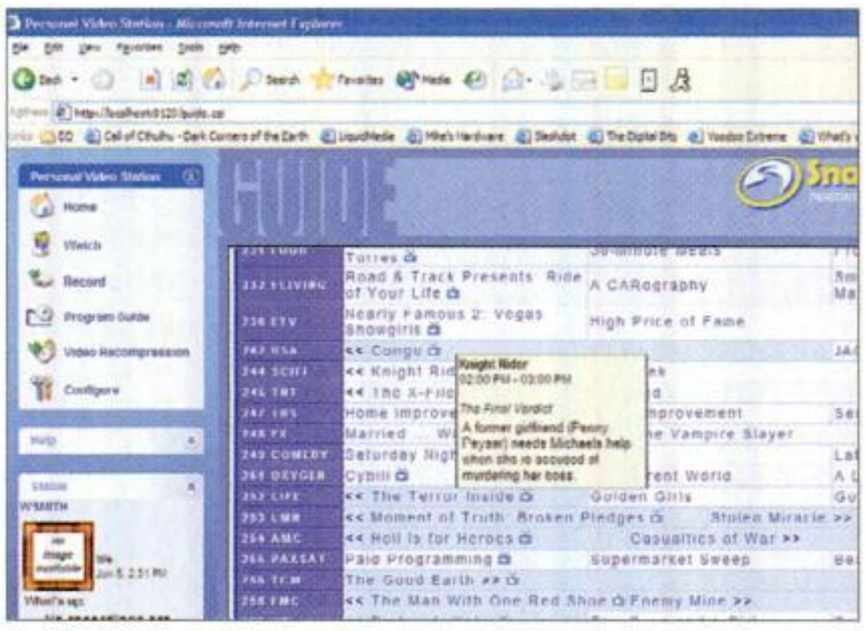
Turn your PC into a PVR that's better than TiVo!

***PVS3's* main interface is remarkably similar to TiVo's, offering access to live TV, your recorded programs, and an easy-to-browse guide from which you can select shows to record.**

If you regularly watch any amount of TV—be it one hour a month or 10 hours a day—a personal video recorder (PVR) will help you make the most of your TV-viewing experience. A standard PVR, such as TiVo, generally does three things: It records television shows to a hard drive (kind of like a VCR); it makes it easy to pick programs to watch or record; and it lets you pause, rewind, and fast-forward live TV whether it's being recorded or not. In combination with a TV-tuner, Snapstream's *Personal Video Station 3* turns your PC into a PVR, offering all the aforementioned goodies, and then some.

Much to our delight, *PVS3* is designed for easy navigation. The program guide (which functions like an interactive *TV Guide*, allowing you to select programs to watch and record) is offered right alongside the PVR's other features. So switching from, say, watching live TV to perusing the program guide can occur quickly and seamlessly using a remote control. *Multimedia Center*—the PVR software that ships with ATI's All-in-Wonder boards—has its program guide in a separate app, making access to it clunky and inconvenient.

PVS3 is also noteworthy for its ability to stream recorded programs to any PC or PocketPC on your network, whether it's Ethernet, Wi-Fi, or even the Internet. Just imagine! By connecting to your home IP address from work you could watch a recorded program on your office PC or PDA. This is *cool*. (Even the very latest TiVo and ReplayTV units only let you share programs with other like devices.) With proper configuration, *PVS3* automatically recompresses the recorded video into a net-friendly Windows Media format, which can be selected to accommodate a particular device. We had great luck streaming video from our PC to a Jornada equipped with a Wi-Fi card. For the time being, streaming is restricted to Compaq iPaqs, HP Jornadas, and the Casio E500. Don't expect DVD-like image and sound quality—the entire stream is about 150Kb/sec. If *PVS3* doesn't offer a streaming setting for your PDA, you'll have to download the entire file to memory before you can watch it.



The web interface makes it easy to watch your recorded shows or live TV from anywhere on the web, assuming you have a fast Internet connection.

Because you can choose different formats for recording and streaming, and keep both files on hand, you can conceivably watch a low-res streamed version of *Futurama* from work during the day, and also have the original, high-quality MPEG-2 archived to a DVD that will play in your set-top box at home. Archiving content to recordable DVD is another thing that neither TiVo nor ReplayTV does efficiently.

Like the latest version of ATI's *Multimedia Center*, *PVS3* includes a "10-foot interface"—meaning the app's graphical interface is clearly visible on a low-resolution TV from 10 feet away. Selecting programs to record and watch, and managing the programs you've recorded happens within the *PVS3* interface using a supported remote control (a complete list of supported units is available on the Snapstream web site). *PVS3* also supports several IR blasters, which allow the software to change the channel on a satellite receiver or digital cable box for greater recording flexibility.

The app is highly configurable, offering options for all types of users, from the dorm-room dweller whose computer also serves as his TV, to the home theater enthusiast who has a PC dedicated solely for use as a PVR. The primary TV-viewing interface can assume either a full-screen or windowed mode and is best suited for use with a remote control. A web-based mode allows easy navigation with a keyboard and mouse. Any mode can be selected each time the PVR is used, or you can set a particular mode to start up automatically.

Of course, you need to instruct *PVS3* on what to record. Luckily, this can be done from the host PC or remotely. Snapstream offers a free online service that you can connect to via a web browser, PDA, or WAP phone, letting you add programs to your recording lineup from anywhere. The Snapstream software on your PC checks in with the online server every 15 minutes and downloads any additions or changes you've made to your schedule. Both TiVo and ReplayTV offer a similar service, but *PVS3* is the only PC-based PVR software that does this. You can leave the house whenever you want and still never miss your favorite TV show!

All in all, the Snapstream package takes full advantage of the customizability and connectivity of the PC platform, while providing an extremely smooth and polished interface.

—WILL SMITH

MAXIMUMPC VERDICT

Personal Video Station 3
SNAPSTREAM

+ SEINFELD

Once configured, *PVS3* provides users with an interface that's visible from up to 10 feet and easily controlled using a remote control. Streaming video to other PCs is extremely cool too!

– MAMA'S FAMILY

This isn't the easiest software in the world to configure, and we'd like to see a smarter recorder that intuits a viewer's likes and dislikes and pre-records suggested programming, just like TiVo.

www.snapstream.com
$50 without remote

9

Copyrighted material

Enter the Matrix

A shaky simulation of a shaky simulated world

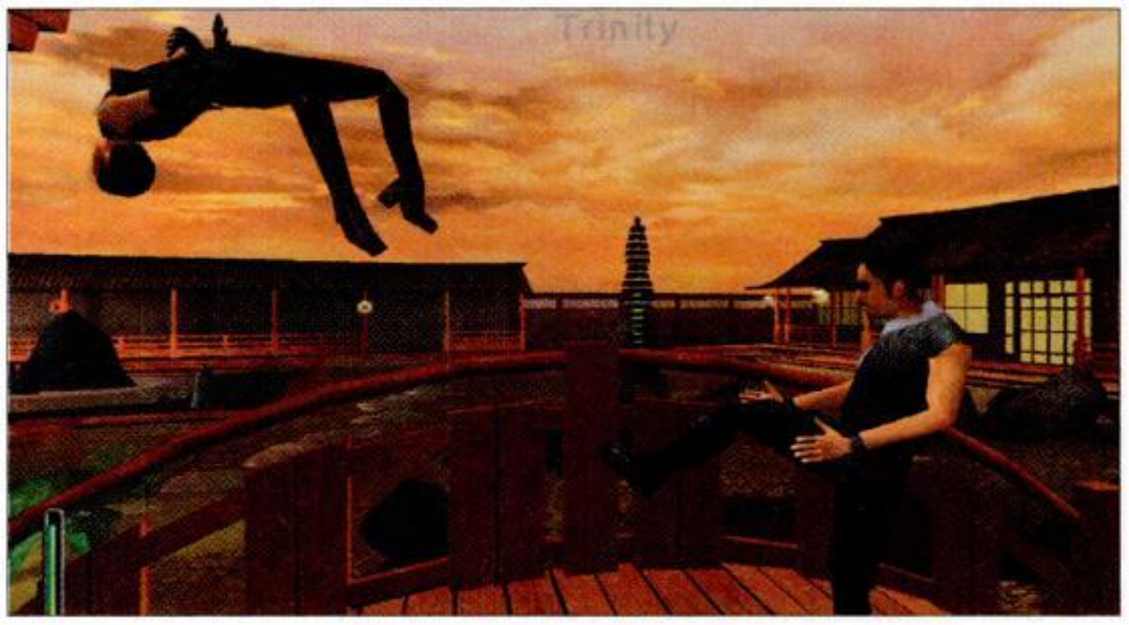
Enter the Matrix isn't the dazzling game it should have been (given the physics-warping acrobatics of the movie on which it's based), but neither is it the sloppy afterthought that many videogame adaptations end up being. The game offers plenty of unforgettable moments, and its success could change how movies and their videogame tie-in's are henceforth conceived.

Enter the Matrix was written and directed by the Wachowski brothers, who wrote and directed the *Matrix* movies. If you play the game all the way through with each of the playable characters, Niobe and Ghost, you'll end up seeing about an hour of live-action footage shot exclusively for the game, and another hour of in-game cinema voiced by the original cast. These overlapping, but unique, storylines augment the events of the *Matrix* films, providing illuminating details on the plot and the secondary characters.

But what we're really here for is the bone-cracking kung-fu, isn't it?

Throughout the game, you'll fight alongside or go up against practically every member of the cast. Most opponents are about as menacing as the perfume sprayers at a department store, and can be taken out with a few button-mashing combos. But when battling adept enemies (such as the dreadlocked Twins) or running from Agents, there's simply no substitute for bullet-time. It's called "focus" in the game, and by holding down the Shift key, you're able to run up walls, dodge flying bullets, and do cartwheels while firing an MP5 sub-machine gun.

That's where the game seriously falters, for three reasons: sluggish controls, horrible clipping, and frame rates that tank at the most inopportune times, even when playing at low resolutions on a 3GHz P4. Ordinarily, such flaws would amount to an embarrassing verdict and ruthless taunting. But *Enter the Matrix* manages to deftly escape humiliation with some breathtaking sequences. One scene expertly recreates the destructive havoc of the lobby fight from the original *Matrix* film, complete with flying debris. Another has you crashing through floors and scaling rooftops with an ornery Agent Smith on your heels in relentless pursuit.



The essence of the *Matrix* is beating the crap out of people. Man, that's gotta hurt.

Go into the game expecting it to look and handle as if it were coded exclusively for the PC, and you'll be sorely disappointed. But if you want a deeper look into the "rabbit hole" with some twitchy kung-fu thrills along the way, we suggest you take the red pill.

—LOGAN DECKER

LEATHER: Despite its serious flaws, Enter the Matrix is still an enjoyable game with unprecedented TLC from Hollywood.

PLEATHER: Players of this game will likely lose the respect of Senior Editor Gordon Mah Ung by supporting a "console mess" so poorly coded for the PC.

MAXIMUM PC VERDICT: 7 $50, www.enterthematrixgame.com

The Sims Superstar Expansion Pack

You're a shining star, no matter who you are

The Sims defines irony. People with poor time-management skills (us included) extract themselves from the couch in order to waste time directing the lives of *simulated* people with poor time-management skills. The *Sims* franchise compels people by the millions to play with fake folks, and has spawned numerous expansions (also known as trips to the cash cow) that allow you to guide your Johnny Sim through the triumphs and travails of dating, pet ownership, days off of work, and now, in the new *Superstar* expansion pack, Sim-ulated fame. And we gotta admit, it's seductive.

In *Superstar* you're given the opportunity to move your sim through the high-stakes world of stardom. Get an agent, hop a ride to "Studio Town," and start moving and shaking through the strata of celebrity as you go from "nobody" to "stepping stone" to—ta da!—"superstar." You'll be acting, singing, modeling, and pressing the palms of countless "anybodies" and "somebodies" along the way. (Three cheers for *finally* having a career track you can manage yourself.) All the while, your needs will demand special care, since *Superstar* twinked them some and you're apt to tire easily.

Besides granting you control of your career, *Superstar* innovates by providing skill-based gameplay in the form of a mini-game that leads to greater and greater levels of notoriety. You are required by a sim-director to perform a sequence of emotions that you discern from the director's yes-or-no feedback to your choices (apparently simlish isn't a good language for conveying expectations). This sort of gameplay replicates one of the more successful elements of *The Sims Online*, and it couldn't be more welcome.

If you're already a fan of *The Sims, Superstar* is an expansion you won't want to miss. (Start making your own Studio Town lots and posting them in the Exchange!) If you're looking for a transformative sims experience, however, you're going to be disappointed since this is just a more intense variation on the ongoing Sims expansion theme.

Singing and dancing enters your Sims' repertoire in *Superstar*.

—ROBERT PALMER MOSELEY

CHARLIE CHAPLIN: Player management of career, complex friend needs.

FATTY ARBUCKLE: Variations on the same theme, energy need drops like mad.

MAXIMUM PC VERDICT: 8

$30, www.sims.ea.com

Copyrighted material

AM-COMPS.COM

Where Power, Performance & Quality Meet

AMD Athlon XP

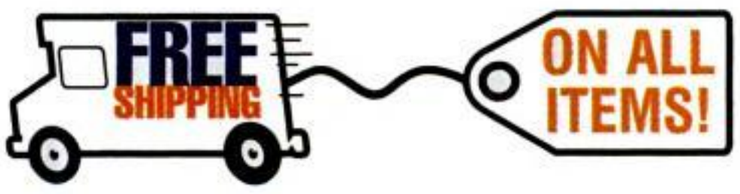
The AMD Athlon XP Processor
Extreme Performance for Windows® XP

PRODUCTIVITY
Tremendous performance while working on multiple applications

MULTIMEDIA
Get rapid results when working with digital media including audio, video, and digital files

QUANTISPEED ARCHITECTURE
The AMD Athlon XP processor features QuantiSpeed architecture, which boosts overall productivity and enables the ultimate computing experience

COMPATIBILITY
Designed to run flawlessly on the world's most popular software



Financing available for purchases over $5000

starting at

$259

NEMESIS DDR

- AMD ATHLON 1.1 GHZ
- 256 MB DDR PC2100
- 40GB 5400 RPM ATA 100 HARD DRIVE
- 56X CD ROM
- 56K MODEM & 10/100 NETWORK ADAPTER
- MOUSE / KEYBOARD & SPEAKERS

starting at

$299

CENTAUR

- INTEL CELERON 1700MHZ
- 256 MB DDR PC2100
- 40GB 5400 RPM ATA 100 HARD DRIVE
- 16X DVD ROM
- 56K MODEM & 10/100 NETWORK ADAPTER
- MOUSE / KEYBOARD & SPEAKERS

HYPERION $2199.00

- CHIEFTEC ALUMINUM CASE W/ WINDOW
- AMD ATHLON XP 3200+ BARTON 400FSB
- ASUS A7N8X DELUXE MOTHERBOARD
- 512MB PC2700 DDR333 RAM
- 2 X WD RAPTOR 36GB S-ATA 8MB CACHE
- ATI RADEON 9800 PRO 128MB DDR 8X
- PLEXTOR 4X DVD+RW / LITE-ON 16X DVD
- WINDOWS XP HOME EDITION SP1
- LOGITECH KB / OPTICAL MOUSE
- LOGITECH Z560 400W THX CERTIFIED SPEAKER

MAXIMUS $1699.00

- CHIEFTEC ALUMINUM CASE W/ WINDOW
- INTEL P4 3.0GHZ 800FSB
- ASUS P4C800 DELUXE MOTHERBOARD
- 512MB PC3200 DDR400 RAM
- MAXTOR 120GB 7200RPM HD
- NVIDIA GEFORCE4 FX 5900 ULTRA 8X
- LITE-ON 52 X 24 X 52 CDRW
- LITE-ON 16X DVD
- WINDOWS XP HOME EDITION SP1
- WIRELESS LOGITECH KB / OPTICAL MOUSE

GODZILLA $949.00

- CHIEFTEC STEEL CASE W/ 500W P.S
- AMD ATHLON XP 2500+ BARTON 333FSB
- ASUS A7N8X NFORCE2 MOTHERBOARD
- 512MB PC2700 DDR333
- MAXTOR 120GB 7200RPM ATA-133
- nVidia GeForce FX 5600 128MB 8X
- LITE-ON 52 X 24 X 52 CDRW
- LITE-ON 16X DVD
- WINDOWS XP HOME EDITION SP1
- LOGITECH KB / OPTICAL MOUSE

TRITON $2999.00

- DUAL INTEL XEON 2.8GHZ
- SUPER MICRO X5DLR-8G2 M.B
- 2GB DDR PC2100 ECC REG. RAM
- 4 X 36GB 10K RPM U320
- ADAPTEC DUAL CHANNEL SCSI U320
- DUAL INTEGRATED 10/100/1000 NIC
- NO OPERATING SYSTEM

DAEMON $1549.00

- DUAL AMD ATHLON MP 2400+
- 1GB DDR PC2100 ECC REG. RAM
- 2 X 120GB 7200 RPM 8MB CACHE HD
- HIGHPOINT ATA-133 RAID CONTROLLER
- INTEGRATED 3COM 10/100 NIC
- 52 X 24 X 52 CDRW
- WINDOWS XP PROFESSIONAL EDITION SP1

ZEUS $899.00

- AMD ATHLON XP 2600+ 333FSB
- ASUS A7V8X-X KT400 MOTHERBOARD
- 512MB PC2700 DDR333 RAM
- MAXTOR 80GB 7200RPM ATA-133
- NVIDIA QUADRO FX-500 128MB 8X
- 52 X 24 X 52 CDRW
- WINDOWS XP HOME EDITION SP1

TYPOON PLUS $1249.00

- AMD ATHLON XP 2600+ 333FSB
- 512MB PC2700 DDR333 RAM
- 80GB 7200RPM ULTRA-ATA 133
- GEFORCE4 TI4200 128MB 8X TV OUT
- 52 X 12 X 52 CDRW / 16X DVD ROM
- 17IN LCD MONITOR
- 39 AMAZING SOFTWARES(GAMES + APPS)
- WINDOWS XP HOME EDITION SP1

MORPHEUS $569.00

- INTEL PENTIUM4 2.66GHZ 533FSB
- 256MB PC2700 DDR333 RAM
- 40GB 7200RPM ULTRA-ATA 133
- GEFORCE4 MX440 64MB 4X TV OUT
- 52 X 24 X 52 CDRW
- 16X DVD ROM
- 56K MODEM + 10/100 NIC

MEDUSA $439.00

- AMD ATHLON XP 2400+ 266FSB
- 256MB PC2700 DDR333 RAM
- 40GB 7200RPM ULTRA-ATA 133
- GEFORCE4 MX440 64MB 4X TV OUT
- 52 X 24 X 52 CDRW
- 16X DVD ROM
- 56K MODEM + 10/100 NIC

For current pricing, upgrade options and to view our entire line of products visit our website.

888-905-9700

www.am-comps.com

1 Albertson Ave, Albertson, NY 11507
PHONE: 516-626-7000 FAX: 516-626-7001
OUR OFFICE HOURS: 10:30 AM to 7:00 Eastern Standard Time

PRICE, SPECIFICATIONS, AND TERMS ARE SUBJECT TO CHANGE WITHOUT NOTICE. SYSTEMS CARRY ONE YEAR PARTS AND LABOR WARRANTY.

Copyrighted material

Enhance your digital lifestyle.

Upgrade your PC today.

INTEL PROCESSORS

PENTIUM 4-Retail Box

3.0 GHz 800FSB 512K	$445
2.8 GHz 800FSB 512K	$294
3.06 GHz 533FSB 512K	$386
2.8 GHz 533FSB 512K	$261
2.66 GHz 533FSB 512K	$198
2.53 GHz 533FSB 512K	$196
2.4B GHz 533FSB 512K	$165
2.0 GHz 400FSB 512K	$172
1.8A GHz 400FSB 512K	$138

PENTIUM III FCPGA/2

P-III 1.4 GHz 512k	$209
P-III 1.13 GHz 256k	$101

CELERON FCPGA2/478

Celeron 2.4GHz s478	$86
Celeron 2.3GHz s478	$81
Celeron 2.2GHz s478	$77
Celeron 2.0GHz s478	$71
Celeron 1.8GHz s478	$66
Celeron 1.7GHz s478	$58

AMD PROCESSORS

ATHLON XP

Athlon XP 3200+ 400FSB	$462
Athlon XP 3000+ 400FSB	$284
Athlon XP Barton 3000+	$264
Athlon XP Barton 2800+	$182
Athlon XP Barton 2500+	$95
Athlon XP 2700+	$138
Athlon XP 2600+	$104
Athlon XP 2400+	$82
Athlon XP 2200+	$69
Athlon XP 2000+	$62
Athlon XP 1900+	$57

ATHLON MP

Athlon MP 2400+	$166

AMD DURON

Duron 1.3 GHz	$35
Duron 1.1 GHz	$33

COOLING ACCESSORIES

COOLERMASTER

SocketA & 370

Jumbo Aluminum Fan	$9
7k RPM Pure Cu	$19
7k RPM Cu Pipe	$34
Low noise Cu Pipe	$34
Univ. 80MM Case	$6

ZALMAN

CNPS 3100+ SKT A	$24
CNPS 6000-CU SKT A	$32
CNPS 7000-CU SKT 754/478	$37
CNPS 57000-D SKT 478	$32

STORAGE

MAXTOR

20GB 133/7200/2MB	$57
40GB 133/7200/2MB	$64
60GB 133/7200/2MB	$80
80GB 133/7200/2MB	$83
120GB 133/7200/2MB	$108

WESTERN DIGITAL

20GB 100/7200/2MB	$58
40GB 100/7200/2MB	$65
80GB 100/7200/2MB	$83
120GB 100/7200/2MB	$113
120GB 100/7200/8MB	$128
180GB 100/7200/8MB	$210

HITACHI/IBM

40GB 100/7200/2MB	$67
60GB 100/7200/2MB	$75
80GB 100/7200/2MB	$85
120GB 100/7200/2MB	$109

SATA-SEAGATE

80GB 150/7200/8MB	$128
120GB 150/7200/8MB	$161

SATA-WESTERN DIGITAL

36.7GB 150/10000/8MB	$161

IOMEGA

250MB Internal	$69
250MB EXT USB	$113

CONTROLLERS

TCW PCI ATA133 RAID	$28
TCW SATA CONTROLLER	$45

PROMISE

PCI ATA133	$36
PCI ATA133 RAID	$92

DRIVE COOLING

PCI Slot System	$6
3.5" SGL FAN HDD	$12
Coolermaster Alum HDD	$21

USB

64MB USB Thumb Drive	$23
128MB USB Thumb Drive	$36
USB 2.0 5port PCI Card	$20
USB 2.0 4port HUB	$32
USB 2.0 EXT IDE Encl.	$72
USB 2.0 A-to-B cable 6ft	$4

CAMERAS

LOGITECH

Quickcam Express	$44
Quickcam Pro 4000	$80

CD-RW

52x24x52 Samsung w/DVD	$78
52x24x52 Lite-On BLK	$59
52x24x52 Lite-On	$57
52x24x52 MSI Retail	$55

DVD R/RW

PIONEER

DVR-A05	$265
DVD-R/RW Media (SINGLE)	$5

SOUND CARDS

CREATIVE LABS

Audigy MP3 5.1	$77
Audigy X-Gamer 5.1	$77
Audigy 2	$119
Audigy2 Platinum	$176
Extigy	$140

WIRELESS NETWORKING

LINKSYS

WIFI USB LAN Adapter	$62
PCMCIA WIFI Adapter v2.5	$60
PCI WIFI Adapter	$60
WIFI PCMCIA -> PCI ADAP	$43
WIFI Access Point	$85
Cable/DSL Router	$115

NETWORKING

SWITCHES/HUBS

8port 10Mb	$26
8port 10/100 Switch	$32
16port 10/100 Switch	$90

NETWORK ADAPTERS

TCW Realtek 10/100	$9
3Com 10/100	$30
Intel Pro 10/100	$29
Intel Pro/1000MT	$57

CABLE/DSL ROUTERS

Linksys 4 Port Router	$62
Belkin4 Port Router	$59

CD ROMS

54X Mitsumi	$24
52X Asus	$26
52X Creative Labs	$29
52X Lite-On	$24

DVD ROMS

16X Samsung	$45
16X Lite-On	$42
16X Lite-On Black	$47

MEMORY

DDR

256MB PC2100	$35
512MB PC2100	$65
256MB PC2100 REG	$48
512MB PC2100 REG	$85
1.0GB PC2100 REG	$212
256MB PC2700	$36
512MB PC2700	$67
256MB PC3200	$43
512MB PC3200	$82

SDRAM

64MB PC100	$21
128MB PC100	$34
256MB PC100	$63
64MB PC133	$21
128MB PC133	$21
256MB PC133	$34
512MB PC133	$65
256MB REG NON-ECC	$66
256MB REG ECC	$57
512MB REG NON-ECC	$78
512MB REG ECC	$81

RAMBUS

128MB PC800 NON-ECC	$48
256MB PC800 NON-ECC	$94
128MB PC800 ECC	$51
256MB PC800 ECC	$100
512MB PC800 ECC	$244
256MB PC1066 16bit	$96
256MB PC1066 32bit	$90

LIFETIME WARRANTY

$7.95 TOTAL SHIPPING!

**on all orders up to 150-lbs

VIDEO CARDS

EVGA - NVIDIA

GeForce FX 5200 64MB	$89
GeForce FX 5200 128MB	$100
GeForce FX 5600 256MB	$228

MSI

TV Anywhere	$53
GeForce 4 Ti 4200-TD8X64	$134

ATI - Built by ATI

AIW 9800 PRO 128MB	CALL

MATROX

Millennium G550 32MB	$99

FIC-Powered by ATI

RADEON 9200 64MB	$87
RADEON 9600 128MB	$195
RADEON 9800 128MB	$400
RADEON 9800 256MB	$502

CASES

TCW

Midtower 350w Black	$59
Enlight Mid 7237 USB	$68
FullTower 300w	$77
Aluminum w/Window	$192
Blk Aluminum w/Window	$192

ANTEC

Sonata Piano Black	$109
SX630II 300W Mini-Tower	$73
SX1040BII 400W File Server	$99
SLK3700AMB 350W	$81

CASE ACCESSORIES

80MM fan guard	$2
6pk Case thumbscrews	$3
Blue Cold Cathode	$18
Green Cold Cathode	$18

MONITORS

17"

AOC 7ELR .23hdp	$127
AOC 7F .21hdp Flat	$137
AOC 7E-BLK .23hdp	$137
AOC 7F-SLK .23hdp	$144

19"

AOC 9GLR .21 mdp	$178
AOC 9KLR .21 mdp	$200

LCD Displays

AOC 15" LM520	$294
AOC 17" LM720	$419
Cornea 17" MP704 BLK	$420
Cornea 17" CT1700	$420
Cornea 18" CT1810	$527

All with Three Year Warranty!

MOTHERBOARDS

PENTIUM4 / CELERON

ASUS

P4PE i845PE	$134
P4C800DX 1875P	$196

INTEL

D845GEBV2L i845GE DDR	$108
D845PEBT2L i845PE DDR	$129
D865 PERKLK 1865PE	$158

MSI

845PE MAX-L i845PE DDR	$94
865PE NEO2-FIS2R	$173
865PE NEO2-SL	$110

BIOSTAR

U8668-G VIA P4M266A	$59

FIC

VC19E+I845PE DDR	$94
P4865PE 1865PE	CALL

ATHLON / DURON

EPOX

8RDA+ NVIDIA nForce2 DDR	$98
8K9A2+ KT400 DDR	$109

BIOSTAR

M7VIG PRO KM266 DDR/SDR	$61
M7VIT PRO KT400 DDR	$68
M7VIK KT400 DDR	$87
M7NCG NVIDIA nForce2 DDR	$108

MICROSTAR

MSI KT3V KT333 DDR	$68
MSI KT4V-L KT400 DDR	$72
MSI KT4 ULTRA SR	$94
K7N2G-L NVIDIA nForce2 DDR	$115
K7N2G-ILSR NVIDIA nForce2 DDR	$142

ASUS

A7S333 SiS DDR	$66
A7V8X KT400 DDR	$106
A7N8X NFORCE2 DDR	$137

MICROSTAR DUAL SCKTA

K7D MASTER LA760MPX	$205

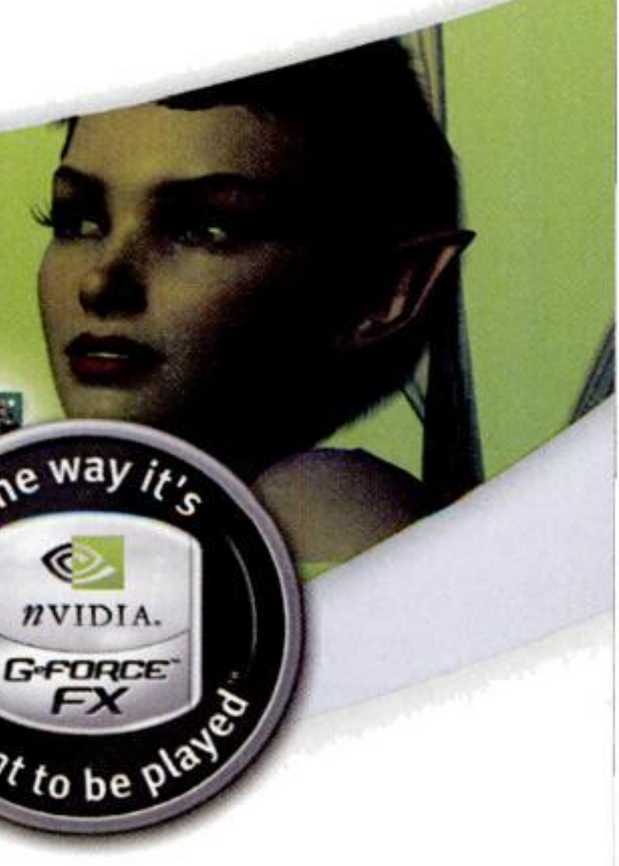
FIC

AU13 w/FW NVIDIA NFORCE2	$96
AN19E KT400 DDR	$95

ACCESSORIES

LOGITECH

Cordless Elite Duo Mouse/Keyboard	$77
Cordless Navigator Duo Mouse/Keyboard	$64
MX 500 Optical MSE	$40
MX 700 Wireless Optical MSE	$65



NVIDIA GeForce FX 5900 Ultra, 256 MB graphics

Architected for blazing speeds and delivering unmatched visual quality, the NVIDIA GeForce FX 5900 Ultra Features cutting-edge technologies that drive a new generation of cinematic gaming effects.

Equip your PC with an NVIDIA GeForce FX 5900 so you can play your games the way they're meant to be played!

TCWO.com

Visit us on the web at www.tcwo.com or Call Toll-Free: 800.941.2750

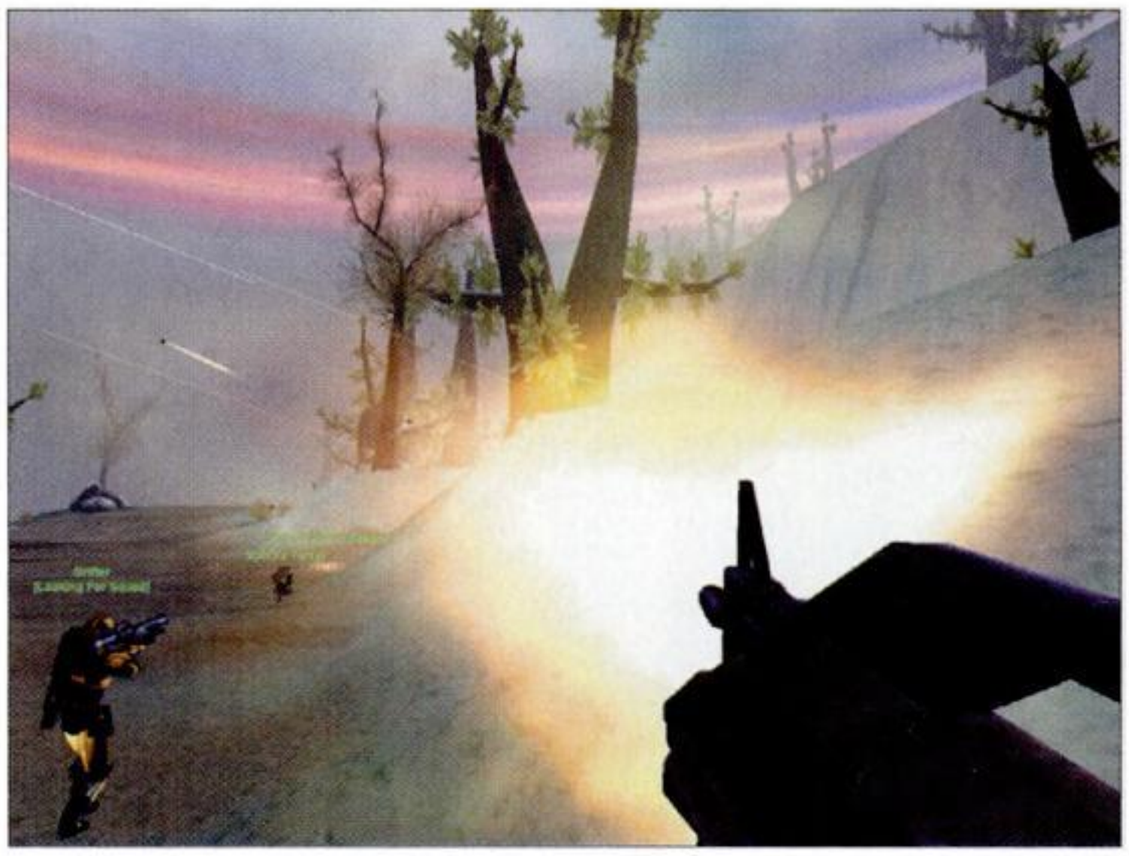
Sales Hours : Mon-Fri 9AM-7PM EST Sales and Customer Service : 800.941.2750

Price, specification, and terms are subject to change without notice, Thompson's Computer Warehouse is not responsible for errors in typography and/or photography.

Copyrighted material

Planetside

Tribes plus a whole lotta people



Once the game really heats up with lots of people and vehicles, it's a blast if your machine can handle it.

Planetside raises an important question about massively multiplayer gaming: At what point does the overhead of a game (its cost and performance) outweigh the benefit of playing with thousands of other people?

When you get right down to it, *Planetside* is *Tribes* with a few added layers of complexity. As the first MMP shooter, *Planetside* has to prove that these layers make it valuable. After all, functional, free online shooters are common as dirt, while *Planetside* costs $12.95 a month and runs little better than a child's Viewmaster.

Like *Tribes*, *Planetside* extends the run-n-gun formula with an emphasis on squad-based operations and a wide array of armor and weapon types, turrets, vehicles, and equipment. *Planetside*, however, takes these elements further, moving the formula closer to the RPG realm. Using points earned in combat, you can rise through the ranks. Your points can be spent to train in specific areas, thus creating a "character" with a unique combination of skills. You can choose the heavy armor and weapons track, focus on engineering and hacking, or perhaps master the broad range of available aircraft and ground vehicles. In time, you can earn enough points to garner all the training and modifications, but the process of getting there entails some interesting choices.

The overarching strategic layer is the other element that is uniquely MMP, and it too is satisfying. Three different factions vie for control of continents by fighting sprawling battles for bases, facilities, towers, and other landmarks. While an individual battle may involve just a few dozen people, such battles are going on all over the planet, and can be entered largely at will.

Unfortunately, once a battle gets large enough to become interesting, the performance lag gets so pronounced as to make the game virtually unplayable. While our east coast testers experienced frequent, crippling lag, players on the west coast didn't report the same problems. If your server is afflicted with this problem, even a low ping and the absolute lowest graphics setting can't keep you from struggling to get a bead on an enemy.

Even if the lag problems are fixed, we doubt anyone on a puny dial-up connection could partake in any kind of 200-person battle. As people rise in ranks and battles become more coordinated, *Planetside* could grow into a more interesting game, but the question will remain: Does it add enough to the *Tribes/Battlefield/Wolfenstein/America's Army* formula to justify $160 a year?

—THOMAS L. MCDONALD

⊕ **TRIBES**: Innovative design concepts add significantly to the FPS formula
⊖ **TRIBES 2:** Spotty performance. Requires a broadband connection.

MAXIMUM PC VERDICT: 6 $50 + $13 a month, www.planetside.com

Tropico 2: Pirate Cove

Drinkin' an' wenchin' an' complex chains of production

When Blackbeard wasn't murdering, robbing, and raping, he was busy creating a thriving economy. Who knew?

Tropico 2 is the latest entry in the long and revered genre of "little people building things and bitching a lot." PopTop's original *Tropico* was an agreeable banana republic simulator with some interesting strategic hooks and a tongue-in-cheek style. Frog City (the team behind *Imperialism*) has ladled a healthy heapin' of pirates onto this plate and served up a largely entertaining town-building and management game.

For starters, Frog City asks the gamer not just to suspend disbelief and morality, but to banish them from the house entirely. First we need to believe that pirates built complex economies and chains of production, established sprawling towns, and went about educating their populace. Next we have to forget that we are forging an entire economy based on kidnapping, slavery, random executions, terror, torture, and forced prostitution.

Strategy is a matter of building production chains, sending ships out on alternate kidnapping and booty runs, and keeping people happy. This last element is in fact the heart of the game, since the entire economy is dependent on A) keeping pirates drunk and laid, and B) terrorizing the slaves with scary decor and torture. It's a simple matter to create the production cycle that will yield a sword (construction tent, ore mine, smelter, and blacksmith), but it's much harder to get an illiterate slob sufficiently drunk to be happy.

The only real problems emerge when the old interface overflows with the new ideas, as it does when you need to use one screen to find and track a person, and another to demand ransom for him, and neither screen works well together.

Aside from a few similar quibbles, there's little else to really complain about in *Tropico 2*. It's a straightforward economic simulation of slavery and debauchery, with some nice touches and plenty of wenches.

—THOMAS L. MCDONALD

⊕ **AHOY MATEY**: Generally entertaining economic and city building game.
⊖ **AAAARGH:** Some elements are an uneasy fit with the original *Tropico*.

MAXIMUM PC VERDICT: 7 $40, www.gathering.com

Copyrighted material

Solve Your Own PC Problems!

Learn to repair PCs and save money, or even make great money in a new career!

We all know there's nothing more frustrating than problems with your PC. Millions of people endure this frustration every day. That's why troubleshooting PC problems is such an important skill these days.

You could save hundreds, if not thousands, of dollars by doing your own repairs. Get your A+® Certification and you could even be on the road to a very profitable career as a PC Repair Technician.

Education Direct at-home training offers comprehensive instruction that will teach you the skills you need to make your own PC repairs. The knowledge you obtain while studying in the comfort of your own home can also qualify you for a promotion, pay-raise, or even a great new job.

Learn the best...from the best.

Nationally accredited Education Direct is the world's leader in at-home education. We've earned that distinction by consistently offering students the best programs with the most up-to-date training methods.

Here's a sample of what you'll learn in the PC Repair Program:

- Installing and upgrading software
- Managing and troubleshooting Microsoft® Windows®
- Motherboard geography
- Multimeter applications
- Upgrading system memory
- Removing, repairing, and replacing disk drives
- Advanced networking topics
- How to troubleshoot viruses
- And much more

Earn great money as a PC Repair Technician.

Jobs for PC Repair Technicians are predicted to grow as much as 14% by 2010!* Businesses require skilled men and women to fix the everyday computer problems a business faces. That means as a PC Repair Technician you'll be in a high-demand, high-salary field.

You can train at home, in your spare time, to learn the skills you need. In as little as nine months, you could have your Career Diploma in PC Repair, proof-positive that you know the ins and outs of fixing computers. You're that close to being able to solve your computer problems — and just as close to starting a new career!

Send for FREE information in one of three easy ways:

For Fastest Service Call Toll Free

1-800-572-1607 ext. 1605

Call anytime, 24 hours a day, 7 days a week.

Visit

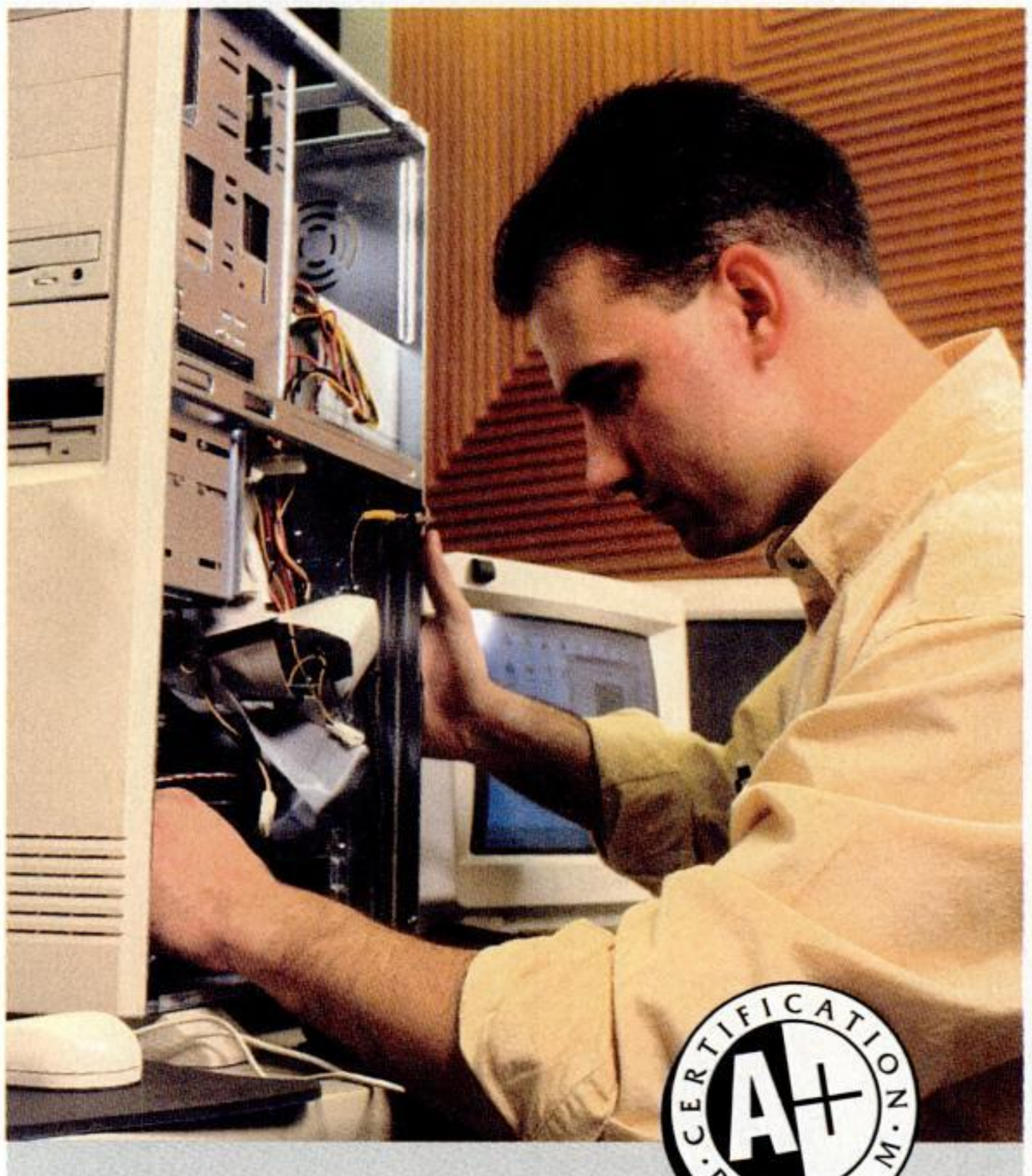
www.EduDirect-usa.com

On the Web, enter ID# PFYS83S

Or

Fill out and mail attached postage-paid card.

* Growth figures represent a ten-year period ending 2010. Source: *National Industry-Occupation Employment Matrix*, a publication of the U.S. Bureau of Labor Statistics.



Advance Your Career with A+® Certification! Education Direct Has the Test Preparation Materials YOU Need!

A+® Certification is fast becoming the standard by which PC Repair Technicians are measured. In fact, many computer manufacturers and servicing companies won't hire you without it! Education Direct provides a valuable A+® Certification Test Preparation Kit along with our complete PC Repair Program, as well as making it available as a separate program. We want to make sure you get the credentials that will get you the job!

Sponsor

A+® Certification Program is an industry-wide, vendor-neutral program developed and sponsored by The Computing Technology Industry Association®.

The Computing Technology Industry Association and A+ are registered trademarks. All rights reserved.

If card is missing, mail coupon to:

THOMSON EDUCATION DIRECT

Dept. PFYS83S
925 Oak Street
Scranton, PA 18515-0700

YES! Please send me FREE information on how I can learn to solve my own PC problems and even start an exciting new career as a PC Repair Technician!

☐ 27 **PC REPAIR**

Other Computer Programs
- ☐ 38 PC Specialist
- ☐ 43 PC Fundamentals*
- ☐ 44 A+® Certification Test Prep.*
- ☐ 53 Desktop Publishing & Design
- ☐ 83 Web Page Designer
- ☐ 105 Computer Graphic Artist
- ☐ 402 Web Programming
- ☐ 403 Internet Multimedia and Design
- ☐ 404 E-Commerce Administration

ASB/AST Degree Programs
- ☐ 62 Mechanical Engineering Technician (AST)
- ☐ 65 Electrical Engineering Technician (AST)
- ☐ 64 Applied Computer Science (ASB)

Computer Programming
- ☐ 01 Programming in BASIC
- ☐ 36 Visual C++®
- ☐ 82 Java®
- ☐ 69 COBOL*

Career Diploma Programs
- ☐ 06 Electrician
- ☐ 07 High School
- ☐ 54 AutoCAD®
- ☐ 79 Electronics Technician
- ☐ 387 Telecommunications Technician

*Certificate Programs

Name _____ Age _____

Street _____ Apt. # _____

City/State _____ Zip _____

Phone ( ) _____ E-mail _____

V317B

Copyrighted material

HardDrive.com

Your Storage Resource

WD Raptor ESATA

Western Digital 36.7GB 10,000RPM Enterprise Serial ATA Hard drive 8mb Cache

$159

K7N2G-ILSR

MSI Socket A NForce 2 ATA 133 DDR 8x AGP ATX Motherboard with SATA, LAN, Firewire, Audio and USB

$142

Mega PC

Hi-Fi Audio + Performance PC + HomeTheater
AM/FM Radio Tuner
Audio CD Player
MP3 Music CD Player
Front Panel LCM Display
Provided Remote Control
TV-Tuner Function (Optional)
6-in-1 Card Reader Function

$297

Requires CPU, Memory, & Hard Drive

We are the largest source for Color Components

We stock thousands of Computer Products

Sales Line: 800-400-3499

Hot Sellers

Gigabyte GA-8INXP

Socket 478 for Intel® Pentium® 4 with Hyper Threading Technology
Dual Channel DDR memory architecture that supports a maximum memory size up to 4GB
The board, coupled with several of the latest cutting edge technologies such as Serial ATA, Gigabit LAN network, ATA 133 RAID, 6-channel audio, plus the usual fare of features unique only to GIGABYTE, the GA-8INXP will bring users an unlimited level of computing experience.

$200

AOpen AX4CMax

- Socket 478 Intel® Pentium® 4
- Intel 875P Canterwood Intel ICH5R
- Hyperthreading Technology
- Promise ATA133 & Serial ATA Raid
- AGP 8X Technology
- Dual-Channel DDR400 Support
- Broadcom Gigabit LAN
- 5.1 Channel Audio
- 8 USB 2.0 Ports
- IEEE 1394

$209

Asus P4C800 Deluxe

Asus P4C800 Deluxe P4 800Mhz DDR AGP8X MB with Audio, LAN, Firewire and USB 2.0.

- Intel 875P Chipset
- 800 MHz FSB
- Dual-Channel DDR400 Memory
- Intel Hyper-Threading Technology
- ASUS AI Intelligence
- AGP Pro 8X slot
- 3COM Gigabit LAN

$209

Sony DRU510A

Sony's latest Dual RW DVD CD drive records up to 4.7 GB of data or more than 2 hours of high quality MPEG2 video on a DVD+RW/+R or DVD-RW/-R disc

$389

EluminX Illuminated Keyboard

The EluminX™ Illuminated Keyboard has arrived! The keyboard illumination is provided using flat panel ElectroLuminescent technology. Awesome for late night computing!!

$89

ATI Radeon 9800 Pro 128Mb

RADEON™ 9800 PRO graphics technology
128MB of DDR memory and a 256-bit memory interface
VGA connector for analog CRT
S-video or composite connector for TV / VCR
DVI-I connector for digital CRT or flat panel
Drive two displays simultaneously with independent resolutions and refresh rates

$405

Intel 3.0Ghz 800Mhz CPU

The new Intel® Pentium® 4 processor at 3 GHz with an advanced 800 MHz system bus offers higher levels of performance, creativity and productivity. The Pentium 4 processor at 3 GHz with an advanced 800 MHz system bus also supports Hyper-Threading Technology, enabling you to multitask more efficiently when you run demanding applications at the same time.

$480

Case Mods

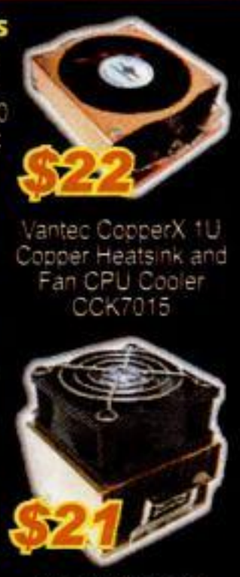
CPU Fans

$19 Thermaltake VOLCANO 7 Intel Socket 370 & AMD Socket 462

$27 Thermaltake VOLCANO 9 AMD Athlon XP up to 2600+

$24 Thermaltake Spark 5 Socket 478 Intel P4 3.0 Ghz and up

$30 Thermaltake Spark 7 Socket 478 Intel P4 3.0 Ghz and up

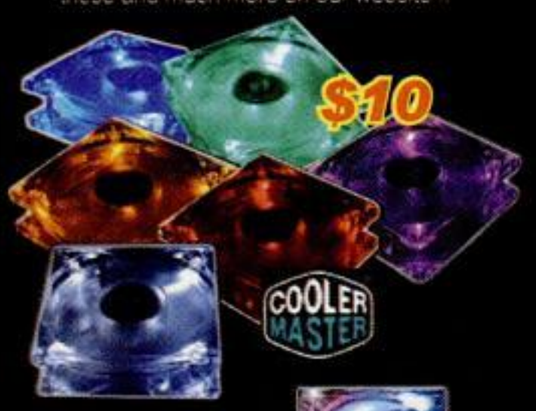


$22 Vantec CopperX 1U Copper Heatsink and Fan CPU Cooler CCK7015

$21 Vantec Copper X Double Ball Bearing Copper Heatsink CPU Cooler Kit CCK7025

Case Fans

We carry A Rainbow of colors on 80mm Case Fans. Wake up your PC Case with these and much more on our website !!



$10

Also Available Tri Colored 80mm LED Fans

$8

Window Kits

We will install any Window Kit for Only $29. Just ship us your case door or case and our professional mod team will do the dirty work for you.

Door Kits	
Rectangle Clear	$19
Orange	$19
Yellow	$19
L Shape	$22
Oval	$22
Top Kits	
Top	$17
Top w/ 92mm hole	$19

Top Kit

Cables

$10 UV-Sensitive Rounded IDE or Floppy Cables. Silver under Normal Light. Blue under UV!

We Carry Tons of Rounded Cables IDE & Floppy in almost every Color

IDE Rounded		Floppy Rounded	
18"	$5	18"	$5
24"	$10	24"	$7

Fan Grills

$10 80mm

$15 120mm

Available in 80mm or 120mm in Gold, Silver, and Black

$20

New !! Man this one will catch your next door neighbors eyes!! Insanely bright 80mm neon Fan Grill available in Dual blue, Dual UV, Single Blue, Single UV, and Swirl.

Window Etching

$8

Water Cooling

$60

New! CPU Cooler with Coolant! Gyrox CP101 CPU cooler with specially formulated coolant to handle the 3.06GH CPU. Ideal for Overclocking, High-Performance CPUs. Truly innovative. Works for both AMD and INTEL Pentium IV CPUs

Aquarius II Liquid Cooling Kit Comes Complete with everything you need to keep your CPU Water Cooled!!

$130

Lighting

$15

Cold Cathodes 12" Available in UV Black, Blue, Red, Green, Purple, Yellow, & combo colored cathodes.

$8

These LED's will shower the interior of your case with extremely bright blue, red, or green light

$15 All New Lighted Video Card Cooler

$39 Much Brighter Strip than before. Apply almost anywhere. Available in Blue and Red 5ft long.

High Powered Fan Control. Controls up to 4 fans and includes 4blue and 4 red led lights. Awsome Mod!!

$29

Service

Custom Window Installation	$29	Fan & Grill Installation	FREE
Custom Blowhole Installation	$29	Cable & Neon Installation	FREE
Drive Bezel Color Change	$15	Complete PC Build	$25

Speakers

Klipsch

Klipsch	5.1	6pc	$399
Klipsch	4.2	6pc	$299
GMX D	5.1	5pc	$299
Klipsch	2.1	3pc	$179

Logitech

Z540	4.1	40W	$69
Z640	5.1	51W	$73
Z560	4.1	400W	$144
Z680	5.1	480W	$288

Monitors

CRT Monitors

Viewsonic	17"	Q71-6 1280x1024	$128
Viewsonic	17"	E70B8 1280x1024	$136
NEC	17"	FE770M 1280x1024	$185
Viewsonic	19"	Q953 1600x1200	$206
Viewsonic	19"	P90F 1920x1440	$292
Samsung	19"	957MB 1920x1440	$300
NEC	19"	AS90 1600x1200	$209
Viewsonic	21"	E2202 1600x1200	$463
Viewsonic	22"	P225FB2 1600x1200	$589

LCD Monitors

NEC	15"	LCD1560NXBK Black	$337
Samsung	15"	152T Silver 1024x768	$358
Sony	15"	SDM-X52 Gray 1024x768	$390
Viewsonic	15"	VE155B Black 1024x768	$303
Samsung	17"	171SBlack 1280x1024	$445
Viewsonic	17"	VE170 Beige 1280x1024	$483
Viewsonic	20.1"	VX2000 Black 1600x1200	$1263
Viewsonic	21.3"	VP211b Thin Edge	$1494
Samsung	21.3"	210T Silver 1600x1200	$1499

MPC0803

Copyrighted material

Instant Copy

Pinnacle Instant Copy provide a suite of CD and DVD creation utilities for true1:1 disc copying and creative optical media storage.

$29

Price Reflects $20 Mail-in Rebate

Want To Build A Custom PC But Need A Little Help ? Call Us !!
Our Sales team can guide you into the PC Of Your Dreams
Custom Build A Center Steps 1-8

So You Want Us to Build It?
$25

Windows XP Home Ed. OEM $109

Windows XP Professional Ed. OEM $149

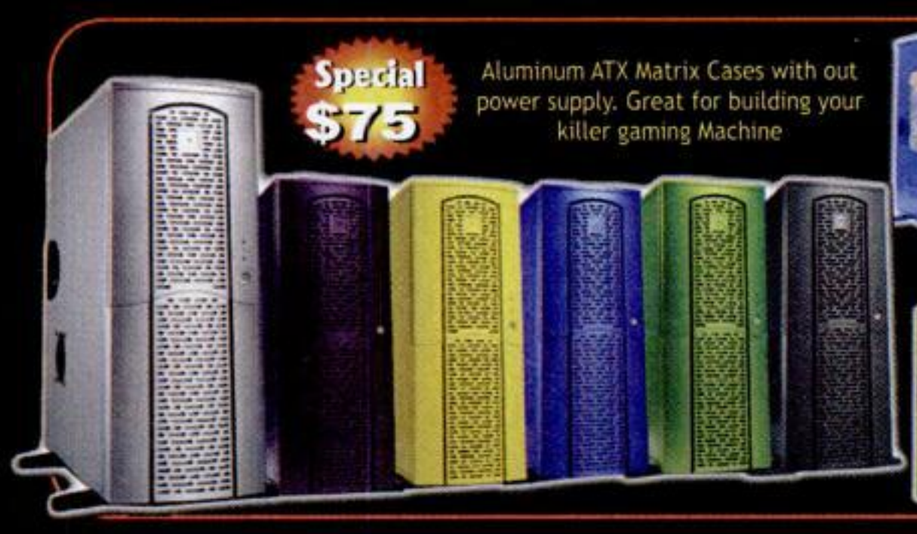
So You Want Us to Load OS & Test Your System?
$45

FX5600 DV128

AOpen Aeplus VGA Card
nVidia GeForce FX5600
DDR 128Mb Memory
Core Clock 325 MHz
AGP 8x Bus
DVI Connector
TV- Out x 1, S-Video x 1
VGA out x 1,
Includes WinDVD

$171

Cases Step 1



Special $75

Aluminum ATX Matrix Cases with out power supply. Great for building your killer gaming Machine

Xaser III Case w/ Window V1000D $165

Xaser III Case w/ Window V1000A $165

Xaser III Aluminum Case w/ Window V2000A $189

Special $145

Aluminum ATX Cases with 420watt P4 / AMD power supply, 4 80mm Multi Color LED Fans, and full side window.

Matrix 14Bay Full Tower ATX Case MA01GND-S $99

AOpen ATX Case W/Window & P4 Power Supply H600B $69

Cooler Master ATX Case Aluminum 10Bay ATC111 $190

Cooler Master ATX Case Aluminum 10Bay ATC111 $190

Clear Acrylic ATX Case Fans Shown not included CLEARCASE $130

Motherboards Step 2

All Motherboards in RED are Dual DDR

Asus	P4C800 Deluxe	$209	P4G8X Deluxe	$204
Gigabyte	GA-8KNXP	$245	GA-8IK1100	$165
	GA-8INXP	$200	GA-SINXP1394	$173
Intel	D845PESV	$102	D845GERG2	$105
	D845GVAD2	$91	D50EMVR	$154
AOpen	AX4CMAX	$209	AX4RPLUS	$179
	AX4GEMAX	$127	AX4SPEMAX	$162
Asus	A7N8X	$121	A7N8XDX	$138
	A7V8XGLFSR	$126	A7V8XLFWSR	$117
	A7V8XLAN	$98	A7V333X	$85
Gigabyte	GA7VAX	$92	GA7VAXPULT	$133
	GA7VKPM	$69	GA7VKMLS40M	$63
AOpen	AK79DMAX	$117	AK79GMAX	$140
	AK778XMAX	$114	MK79GNk	$105

Processors Step 3

Celeron	2.2 GHz 128 cache	$93	P4	2.53GHz 512k 533	$214
Celeron	2.3 GHz 128 cache	$102	P4	2.66GHz 512k 533	$222
Celeron	2.4 GHz 128 cache	$118	P4	2.66GHz 512k 800	$251
Xeon	2.4GHz 512 cache	$237	P4	2.8GHz 512k 533	$302
Xeon	2.66GHz 512 cache	$312	P4	2.8GHz 512k 800	$320
Xeon	2.8GHz 512 cache	$489	P4	3.0GHz 512k 533	$462
P4	2.4GHz 512k 533	$188	P4	3.0GHz 512k 800	$459
P4	2.4GHz 512k 800	$205	P4	3.2GHz 512k 800	$689
XP	2100+ Retail 266Mhz	$85	XP	3000+ Retail 333Mhz	$292
XP	2200+ Retail 266Mhz	$85	XP	3200+ Retail 400Mhz	$489
XP	2400+ Retail 266Mhz	$95			
XP	2500+ Retail 333Mhz	$100			
XP	2600+ Retail 333Mhz	$115			
XP	2700+ Retail 266Mhz	$155			
XP	2800+ Retail 333Mhz	$201			

New AMD XP 3200+ Goes Great with the Asus A7N8X Motherboard and Corsair PC3200 DDR 400Mhz Memory!!

Memory Step 4

SDRAM

Branded	PC133	512MB 64x64 133MHz	$59

DDR Memory

Crucial	PC2100	128MB DDR 266MHz	$28
Crucial	PC2100	256MB DDR 266MHz	$67
Crucial	PC2100	512MB DDR 266MHz	$85
Crucial	PC2700	128MB DDR 333MHz	$37
Crucial	PC2700	256MB DDR 333MHz	$59
Crucial	PC2700	512MB DDR 333MHz	$119
Crucial	PC3200	256MB DDR 400MHz	$79
Corsair	PC3200	512MB DDR 400MHz	$120
Kingston	PC3500	256MB Hyper X 434MHz	$110
Kingston	PC3500	512MB Hyper X 434MHz	$210

HardDrives Step 5

Maxtor	80GB	7200rpm	ATA 133	6Y080L0	$88
Maxtor	120GB	7200rpm	ATA 133	6Y120L0	$113
Maxtor	160GB	7200rpm	ATA 133	6Y160L0	$174
Maxtor	200GB	7200rpm	ATA 133	6Y200PO	$265
Maxtor	250GB	5400rpm	ATA 133	5A250J0	$347
Maxtor	250GB	7200rpm	ATA 133	6Y250PO	$375
Seagate	60GB	7200rpm	ATA 133	ST360015A	$85
Seagate	80GB	7200rpm	ATA 133	ST380011A	$95
Seagate	120GB	7200rpm	ATA 133	ST3120022A	$127
Seagate	80GB	7200rpm	SATA	ST380023AS	$135
Seagate	120GB	7200rpm	SATA	ST3120026AS	$164
Seagate	160GB	7200rpm	SATA	ST3160023AS	$217
WD	36.7GB	10000rpm	SATA	WD360GD	$159
WD	80GB	7200rpm	ATA100	WD800JB	$102
WD	120GB	7200rpm	ATA100	WD1200JB	$135
WD	180GB	7200rpm	ATA100	WD1800BB	$199
WD	200GB	7200rpm	ATA100	WD2000JB	$239
WD	250GB	7200rpm	ATA100	WD2500JB	$349

Video Cards Step 6

EVGA	064A4N302T4	GEFORCE FX 5200 64MB DDR TV-Out	$88
EVGA	128A8N306T4	GEFORCE FX 5200 128MB DDR TV-Out	$97
EVGA	128A8NV85T3	GEFORCE4 TI4600 128MB 8X AGP	$265
Gainward	ULTRA6508X	GEFORCE4 TI4200 128MB DDR	$195
Gainward	VG4TI42DTF	GEFORCE4 TV/DVI 64MB	$150
Gainward	ULTRA 750-8X XP	GEFORCE4 TI4800 SE 128MB 8XAGP	$220
BFG	ASLM52128	GEFORCE FX 5200 128MB X AGP	$94
BFG	ASLM52128U	GEFORCE FX 5200 Ultra 128MB 8X AGP	$185
BFG	ASLM56256	GEFORCE FX 5600 256MB 8X AGP	$231
MSI	MX440T8X	GEFORCE4 MX440 64MB DDR 8X AGP	$71
MSI	G4TI4200VTD8X	GEFORCE4 TI4200 128MB DDR 8X AGP	$164
MSI	TI4800SETD8X	GEFORCE4 TI4800 128MB DDR 8X AGP	$187
ATI	100434102	Radeon 9500 Pro 128MB TV-Out, DVI	$204
ATI	100434003	Radeon 9700 Pro 128MB 8x TV Out	$359
ATI	100713001	Radeon AIW 9700 Pro 128MB DDR 8x	$405
ATI	100435002	Radeon 9800 Pro 128MB DDR 8x AGP	$419

Sound Cards Step 7

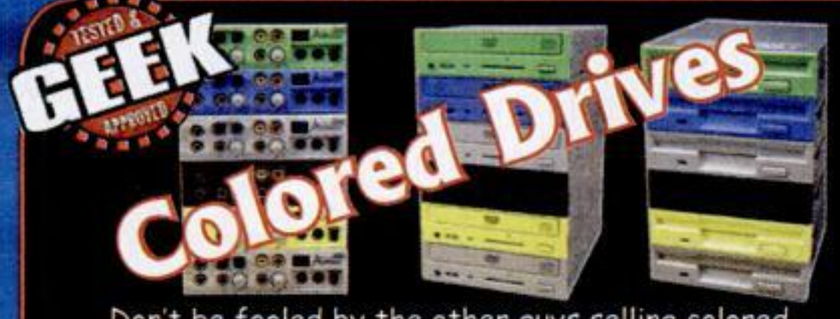
Creative Labs Audigy 2 Platinum is also available in Black, Silver, Blue, Yellow & Green
Audigy 2 Platinum Black Bezel $19

Turtle Beach	Santa Cruz 32-bit	$73
Turtle Beach	Santa Audiotron 100	$272
Creative Labs	Audigy X Gamer	$90
Creative Labs	Audigy MP3	$89
Creative Labs	Audigy 2	$115
Creative Labs	Audigy 2 Platinum	$176
Creative Labs	Audigy 2 Platinum Ex	$229

Creative Labs Sound Blaster Extigy USB External Sound Card With Remote.

$133

CD-R/RW/DVD/DVD-RW & Floppy Drives Step 8



Don't be fooled by the other guys selling colored components. Our Colored Components Have been Maximum PC GEEK Tested and Approved. Tested against scratches, stains, heat, washability, and durability.

				Beige	Color
		CDRW Drives			
48x12x48	IDE	Pacific Digital U-30127		$70	$85
48x24x48	IDE	Plextor PXW4824TA		$93	$108
48x24x48	IDE	Plextor PX320ASW	DVD Combo	$145	$160
52x24x48	IDE	TDK AI-5200		$86	$101
52x24x52	IDE	Samsung SW252BRNS		$55	$70
52x24x52	IDE	Lite-On LTR5224		$55	$70
52x24x52	IDE	BenQ 5224P		$55	$70
52x24x52	IDE	Pacific Digital U-30146		$80	$95
52x24x52	IDE	Sony CRX220A1		$80	$95
52x24x52	IDE	GoldStar GCE8520		$60	$75
52x24x52	IDE	Teac CDW552		$66	$81
52x24x52	IDE	MSI MS8352		$55	$70
40x12x40	SCSI	Plextor PXW4012TS/SW		$205	$220

			Beige	Color
		DVD Drives		
16x/48x	IDE	Toshiba SDM1712TA	$48	$63
16x/40x	IDE	Pacific Digital U-30115	$59	$74
16x/40x	IDE	Pioneer DVD Tray DVD120	$49	$64
16x/40x	IDE	BenQ DVD1648A	$47	$62
16x/40x	IDE	Sony DDU1621	$72	$87
16x/48x	IDE	Samsung SM348 48x24x48/16x	$75	$90
10x/40x	SCSI	Pioneer DVD305S	$104	$119
		CD-ROM Drives		
52x	IDE	Lite-On LTN526	$30	$45
52x	IDE	Creative Labs BLASTER52X	$35	$50
56x	IDE	BenQ CD656A	$29	$44
		DVD-RW Drives		
24x10x32	IDE	Sony DVD+R/RW DRU510A	$389	$404
2.5x	IDE	PDC DVD+R/RW CDRW U30134	$280	$310
		Floppy Drives		
Mitsumi	IDE	1.44MB D359M3	$13	$17
Sony	IDE	1.44MB MPF920	$13	$21

Removable Drives

		USB2.0 Hard Drives		
Buslink	60GB	7200rpm	UII-6072E	$173
Buslink	80GB	7200rpm	UII-8072E	$200
Buslink	100GB	7200rpm	UII-1007E	$222
Iomega	120GB	7200rpm	32394	$237
Maxtor	200GB	7200rpm	S01J250	$398
Maxtor	250GB	5400rpm	S01J250	$399
		USB Removable Drives		
Iomega	100MB	Zip Ext USB Drive	31714	$78
Iomega	250MB	Zip Ext USB Drive	31310	$125
Iomega	750MB	Zip Ext USB Drive	32324	$165

Keyboard / Mouse

HDC KeyBoard & Mouse Combo Available in Black,Red, Silver, Blue, Yellow & Green

$35

$35

Chieftec Wireless KeyBoard & Mouse Combo Available in Black, Golden Brown, Silver, Blue, Yellow, Purple & Green

Mitsuko Black Scroll Mouse **$3**

Microsoft Intellimouse Explorer **$35**

Logitech MX700 RF Cordless Optical Mouse w/Base **$70**

Power Supply

Enermax

Dual Fan P4 Ready	
300 Watt EG301P-VE	$47
350 Watt EG365P-VE	$55
430 Watt EG465P-VE	$84
550 Watt EG651P-VE	$155
Dual Whisper Fan P4 Ready	
350 Watt EG365PVEFC	$59
350 Watt 365PVECA	$75
431 Watt EG465PVEFC	$95
430 Watt EG465VEFCA	$99
Redundant Hot Swappable P4 Ready	
400 Watt ERM2400V	$329
300 Watt EVR3006	$279

Sales Line: 800-400-3499 www.HardDrive.com

ThorTek Corp. 15355 Blackhawk Friendswood ,Texas 77546 Lifetime FREE technical support.

Prices & Specs subject to change without notice. Shipping charges are non refundable. Returns may be subject to restocking fee. Products are covered by manufacturers warranty only.

We accept all Government PO's. Local calls 281.819.9000 Fax 281.819.9001

MPC0803

Copyrighted material

Look Inside

building the best systems since 1990

What is considered to be **a great gaming computer?**

Is it its cool case?
Is it its slim monitor?
Is it its sleek speakers?

Well... that would be good.

But to be **GREAT**, it's what is **inside that counts!**

Q: What about performance?

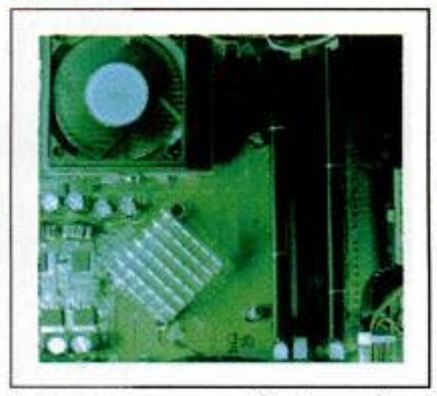
A: "Blistering performance." "A fantastic system for games." -- *Rich Brown, CNET.com*

Q: What about service?

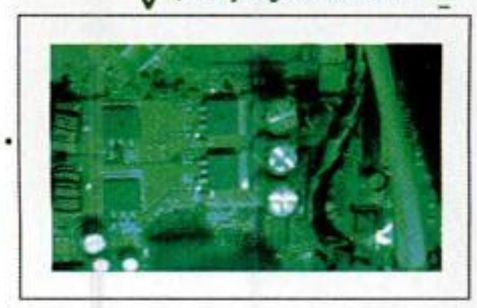
A: "ABS was the only national PC vendor to earn a rating of Good for service in our latest reader survey." -- *Mick Lockey, PC World*

NVIDIA® GeForce™ FX 5900 Ultra AGP 8X Video Card

>> NVIDIA nForce™2 Chipset Motherboard



NVIDIA SoundStorm™ Audio Processor Unit (APU) w/Dolby Digital Encoder



Corsair XMS PC3200 Memory

Seagate Serial ATA150 Hard Drives

Add More

HP® PhotoSmart 7550 Printer

$285

Olympus D-560 Zoom 3.2M Pixel Digital Camera

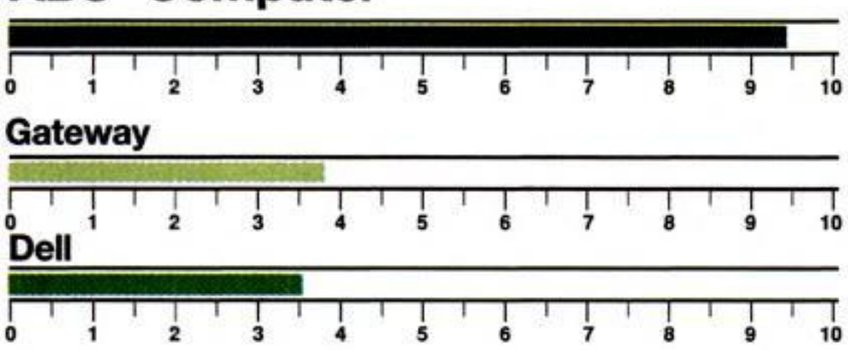
$269

www.abspc.com

Copyrighted material

Customer Satisfaction

ABS® Computer



>> Source: Resellerratings.com June 12, 2003

I talked to all the big name gaming PC companies during my research, and I judged ABS the BEST. I am glad I did. A great price and a great system. What more can you ask for?

-- B. Moore from Detroit, Michigan

The AMD Athlon™ XP Processor
-- Extreme Performance for Windows® XP

Productivity
* Tremendous performance while working on multiple applications

Multimedia
* Get rapid results when working with digital media including audio, video and digital files

AMD Athlon™XP

ABS® Ultimate M5

CoolerMaster ATC-710-SX1 Case with Acrylic Windows

Antec TrueBlue 450-Watt Power Supply

>> **NVIDIA nForce™2 DDR400 AGP 8X Motherboard w/Dual LAN & IEEE 1394**

Corsair XMS 512MB PC3200 Dual-Channel DDR SDRAM Memory

>> **Two Seagate 80GB 7200RPM Serial ATA150 Hard Drives w/8MB Cache**

Pioneer 16X DVD Player

>> **New NVIDIA® GeForce™ FX 5900 Ultra w/256MB AGP 8X Video Card w/TV-Out & DVI**

NVIDIA SoundStorm™ Audio Processor Unit (APU) w/Dolby Digital Encoder

Microsoft Wireless Optical Desktop Keyboard and Mouse

Microsoft Windows® XP Home Edition

Free Games: Microsoft Age of Empires II and Delta Force: Black Hawk Down

Free Software: Microsoft Works 7.0

Free 1 Year Onsite Service with 24/7 Technical Support

Free ABS® PC Organizer (3" Color Binder for Manual, Drivers, etc.)

Add NEC 22" .25mm 1920x1440 Color Monitor @ $549

>> *Power up your M5*

Elevate your gaming experience to the highest level

AMD Athlon XP 3200+ 400MHz FSB processor

Corsair XMS 1GB PC3200 Dual-Channel DDR SDRAM

Creative Labs Sound Blaster Audigy 2 Sound Card w/IEEE 1394

Pioneer AO5 DVD-R / RW Drive

Logitech Z-680 5.1 THX 6-Piece Speaker System

$2699

AMD Athlon™ XP Processor 3000+ with QuantiSpeed™ architecture** outperforms competitive 3.0GHz processors **$1799**

AMD Athlon™ XP Processor 3200+*	**$1929**
AMD Athlon™ XP Processor 2800+***	**$1699**
AMD Athlon™ XP Processor 2600+*****	**$1629**

ABS® PCs use genuine Microsoft® Windows®
www.microsoft.com/piracy/howtotell

ABS® recommends Microsoft® Windows® XP

PC WORLD BEST BUY — Awesome 3380 & Awesome 3450 July 2003
GAMING EDITORS' CHOICE — November 2002
Editors' Choice c|net — November 2002
EDITOR'S CHOICE FiringSquad — January 2003
TECH edge BEST BUYS — November 2002
PC MAGAZINE EDITORS' CHOICE — November 2002
PC GAMER EDITORS' CHOICE — May 2003

ABS®

www.abspc.com/4game | 800.876.8088

▸1 Year Limited Parts Warranty ▸Lifetime Labor Warranty ▸Lifetime Toll-Free Tech Support ▸30 Days Money Back Guarantee

▸▸Sales Hours: Mon-Fri 8:30AM-5:30PM PST ▸▸Technical Support: Mon-Fri 8:30AM-5:30PM PST

Price, specification, and terms are subject to change without notice. Illustrations may not accurately represent exact configurations priced. ABS® is not responsible for errors in typography and/or photography. 30-day money back guarantee does not include opened software, parts, or special order merchandise. Original shipping and handling fee along with return shipping charge are non-refundable. Products returned after 30 days or in a non-refundable condition are subject to a restocking fee. Onsite service may be provided by contracted third party provider. Technician will be dispatched if necessary following phonesupport. AMD,the AMD Arrow logo,AMD Athlon, AMD Duron, and combinations thereof are trademarks of Advanced Micro Devices, Inc. *QuantiSpeed™ architecture operates at 2.2GHz. **QuantiSpeed™ architecture operates at 2.17GHz. ***QuantiSpeed™ architecture operates at 2.167GHz. ****QuantiSpeed™ architecture operates at 2.0GHz. *****QuantiSpeed™ architecture operates at 1.8GHz ******QuantiSpeed™ architecture operates at 1.67GHz.

Copyrighted material

NewEgg.com -- Online Computer Parts, Peripherals, Components, and Accessories-Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites History

Address http://www.newegg.com/

4 Million+ Unique Visitors Per Month | RMA REQUEST | RMA STATUS | VIEW CART | ACCOUNT UPDATE | WISH LIST | ORDER STATUS

newegg.com

ALL PRODUCTS | COMPUTER HARDWARE | SOFTWARE | MAC STORE | DIGITAL CAMERA | NETWORK | ELECTRONICS & ACCESSORIES | CELLULAR PHONE | GENERIC PRODUCTS | REFURBISHED ITEMS | ?HELP

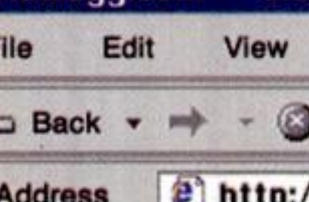
SHOP BY CATEGORY | SHOP BY BRAND | TOP 10 SELLERS | NEW PRODUCTS | SPECIAL SALES | REBATE SALES

SEARCH: Description (Detail View) (Enter Find It Code™ Here) go ADVANCED SEARCH

Find It Code™

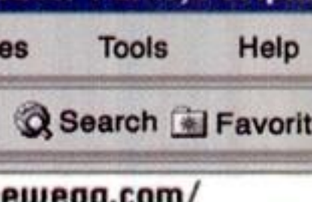
Best Value, Always!

Maxtor 120GB 7200RPM 8MB Cache Hard Drive - OEM



$114.00 MPC22144148

Maxtor 40GB 7200RPM 2MB Cache Hard Drive - OEM

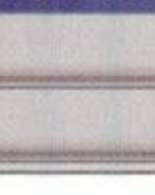


$59.00 MPC22140133

Intel Pentium 4 2.4CGHz 512K Socket 478 Hyper Threading Technology 800MHz FSB - Retail

$182.00 MPC19116157

AMD Athlon XP 2400+ 266MHz FSB 256K Processor - Retail



$86.00 MPC19103336

Altec Lansing 221 2.1 Amplified Speaker 3 Piece System - Retail

$48.00 MPC36113132

Seagate 120GB 7200RPM Serial ATA 8MB Cache Hard Drive - OEM

$145.00 MPC22148017

Toshiba Notebook 40GB 5400RPM 2MB Cache - OEM

$121.50 MPC22149007

Intel Pentium 4 3.0CGHz 512K Socket 478 Hyper Threading Technology 800MHz FSB - Retail

$418.00 MPC19116156

AMD Athlon XP 2800+ Barton 333MHz FSB 512K Processor - Retail

$178.00 MPC19103377

Creative Labs MegaWorks 550 THX 5.1 Speaker - Retail

$226.00 MPC36116118

Kingston HyperX Series 512MB PC2700 64x64 DDR RAM - Retail

$84.00 MPC20144104

Corsair XMS Extreme Memory Speed Series 256MB 32Mx8 PC3200 C2 w/ Heat Spreader - OEM

$59.60 MPC20145415

Abit IC7 Intel 875P Case Motherboard for Socket 478 P4 Canterwood ATX - Retail

$143.00 MPC13127153

Epox Model# EP-8RDA+ Motherboard for AMD Athlon/Athlon XP/Duron Processors - Retail

$85.00 MPC13123191

Logitech Z-680 5.1 Metallic Silver Speaker 500 Watt THX Certified w/ Dolby Pro Logic II - Retail

$290.00 MPC36121105

Geil 512MB PC3200 400MHz Ultra-CAS 2.5 DDR RAM - OEM

$74.00 MPC20144305

Crucial Micron 256MB 32x64 PC2100 DDR RAM - OEM

$31.99 MPC20145001

Intel Model# BOXD865GBFL Pentium 4 800MHz FSB Motherboard - Retail

$123.00 MPC13121190

Asus Model# A7V8X-X Motherboard for AMD Athlon/Athlon XP/Duron Socket A Processor - Retail

$68.99 MPC13131451

Creative Labs Model# SB0244VP Sound Blaster Audigy 2 - OEM

$78.00 MPC29102158

MSI Model# TI4200-VTD8X GeForce 4 TI4200 128MB 8X AGP Dual VGA Card - Retail

$136.00 MPC14127070

ATI Radeon 9600 Pro 128MB 8X AGP DVI/TV - Retail

$178.00 MPC14102276

Lite On Model# LTR-52246S 52x24x52 CD-RW Drive - Retail

$51.50 MPC27106184

Sony Model# DDU1621/B2 Black 16X DVD-ROM 48X CD-ROM Drive - OEM

$45.00 MPC27131002

Creative Labs Model# SB0240P Sound Blaster Audigy 2 Platinum - Retail

$167.00 MPC29102155

Asus Model# V9520TD GeForce FX5200 Video Card w/ DVI - Retail

$94.99 MPC14121149

ATI Sapphire Radeon 9800 Pro 256MB DVI/TV 8X AGP - OEM

$502.00 MPC14102280

Plextor Model# PX-504A-SW DVD+R/RW IDE Drive - Retail

$226.00 MPC27131305

LG Electronics 48x24x48 CD-RW/ 16X DVD-ROM Combo Drive - OEM

$67.00 MPC27128107

M-Audio Revolution 7.1 Surround Sound Card - Retail

$90.00 MPC29121101

98% orders ship within 1 business day! Realtime inventory and pricing.

3,800+ of customer experiences for you to read and compare.

Winner of the Bizrate.com Circle of Excellence Award

40,000+ of product reviews from buyers like you.

9.80/10 Rating from 4,500+ Reviews on Resellerratings.com.

Bizrate.com Certified Merchant with 98% Satisfactory Rating from 25,000+ customers.

Copyright 2003 NewEgg.com., All rights reserved. All prices and specifications are subject to change without notice. NewEgg.com is not responsible for typographical errors. All typographical errors are subject to correction.

Copyrighted material

NewEgg.com -- Online Computer Parts, Peripherals, Components, and Accessories-Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites History

Address http://www.newegg.com/

4 Million+ Unique Visitors Per Month | RMA REQUEST | RMA STATUS | VIEW CART | ACCOUNT UPDATE | WISH LIST | ORDER STATUS

newegg.com

ALL PRODUCTS | COMPUTER HARDWARE | SOFTWARE | MAC STORE | DIGITAL CAMERA | NETWORK | ELECTRONICS & ACCESSORIES | CELLULAR PHONE | GENERIC PRODUCTS | REFURBISHED ITEMS | ?HELP

SHOP BY CATEGORY | SHOP BY BRAND | TOP 10 SELLERS | NEW PRODUCTS | SPECIAL SALES | REBATE SALES

SEARCH: Description (Detail View) (Enter Find It Code™ Here) go ADVANCED SEARCH

Find It Code™

Best Value, Always!

KDS Model# VS-7P Professional Business Color 17" CRT Monitor - Retail

$122.00 MPC24155007

NEC Model# LCD1760V-BK MultiSync 17" Flat Panel LCD Monitor - Retail

$429.00 MPC24002078

Half Life Platinum Edition 2 PC Game - Retail

$25.00 MPC32128103

Viewsonic Model# E90f+SB 19" PerfectFlat CRT Monitor - Retail

$240.00 MPC24116201

Samsung Model#191T 19" Flat Panel LCD Monitor - Retail

$662.00 MPC24001030

Unreal Tournament 2003 PC Game - Retail

$31.00 MPC32129102

Dynapower Model# METIS CS-13ASB.701 2X USB ATX Mid-Tower Case w/ 300 Watt Power Supply - Retail

$38.00 MPC11138001

Enlight Model# EN-PA310104 ATX Mid-Tower Case w/ 300 Watt Power Supply - Retail

$54.00 MPC11116151

McAfee Virus Scan 7.0 w/ One Year of Updates - OEM

$14.00 MPC32108501

Chieftec Aluminum Workstation Tower w/ Plastic Front Cover USB 2.0 450 Watt Power Supply - OEM

$89.00 MPC11125200

Antec Life Style Series Sonata Piano Black w/ 380 Watt Power Supply - Retail

$119.99 MPC11129127

Microsoft Windows XP Pro Upgrade Version Academic - Retail

$86.00 MPC37116112

Apacer Handy Drive 128MB USB Flash Hard Drive - Retail

$34.00 MPC20180701

Palm Zire 71 Handheld Organizer - Retail

$269.00 MPC58101116

Canon I950 Photo Printer - Retail

$235.00 MPC28102116

Optodisc DVD-R 4.7G Version 1X/2X Speed 50 Pack Cake Box - Retail

$54.99 MPC17131735

Shuttle XPC Series Model# SB61G2 Silver Barebone PC Intel Socket 478 800MHz FSB Intel 865G Chipset - Retail

$345.00 MPC56101219

Epson Perfection 2400 Photo Scanner - Retail

$179.00 MPC38110107

Antec Cobra Model 77226 ATA 133 Round Cable - Retail

$18.95 MPC12105001

Logitech Cordless MX Duo Keyboard and Mouse - Retail

$91.00 MPC23126124

Panasonic Model# DVD-S55S Digital Remastering Progressive Scan DVD Player - Retail

$119.99 MPC82103007

Buy Your Next Digital Camera Here!

Canon PowerShot A70 3x Optical Zoom 3.2x Digital Zoom - Retail 3.2MP

$293.00 MPC30120009

Canon PowerShot G3 4x Optical Zoom 3.6x Digital Zoom - Retail 4.0MP

$559.00 MPC30120003

Nikon Coolpix 3100 3x Optical Zoom 4x Digital Zoom - Retail 3.2MP

$295.00 MPC30113110

Nikon Coolpix 5700 8x Optical 4x Digital Zoom - Retail 5.0MP

$899.00 MPC30113102

Olympus C-4000 Zoom 3x Optical 3.3x Digital Zoom - Retail 4.0MP

$389.00 MPC30111105

Olympus D-560 Zoom 3x Optical 3.4x Digital Zoom - Retail 3.2MP

$263.00 MPC30111118

Sony Cyber-Shot 3x Optical 3.2 Smart Zoom - Retail 3.2MP

$300.00 MPC30150023

Sony Mavica 3x Optical 3.2x Smart Zoom - Retail 3.2MP

$439.00 MPC30150028

Kodak Easy Share CX4200 2x Digital Zoom - Retail 2.0MP

$136.00 MPC30170002

Hewlett-Packard Photosmart 935xi 3x Optical 7x Digital - Retail 5.3MP

$391.00 MPC30119007

Samsung 128MB Smart Media Card - OEM

$27.50 MPC20167108

Dane-Elec 128MB Compact Flash Memory Card - Retail

$27.00 MPC20160003

Olympus xD-Picture 128MB Memory Card - Retail

$59.50 MPC20196102

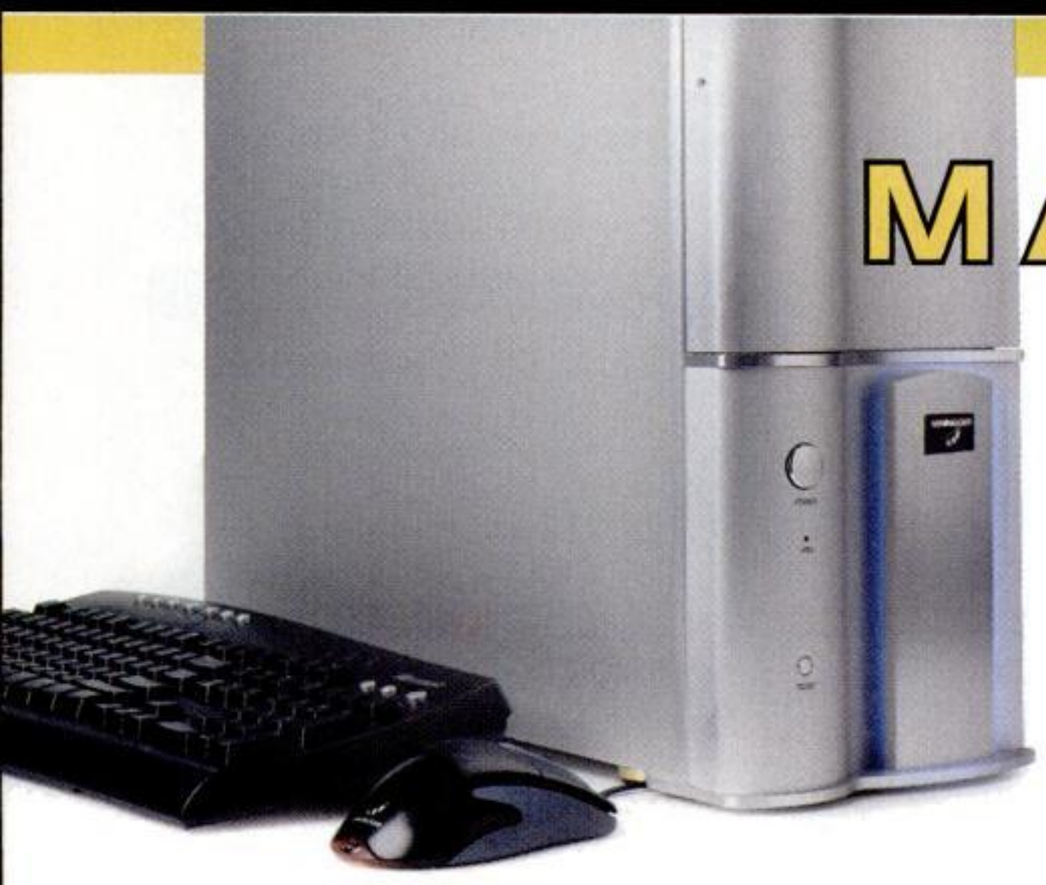
Sandisk Secure Digital 256MB Memory Card - Retail

$72.00 MPC20180600

Copyright 2003 NewEgg.com., All rights reserved. All prices and specifications are subject to change without notice. NewEgg.com is not responsible for typographical errors. All typographical errors are subject to correction.

Copyrighted material

For the Ultimate Gaming Experience, Get into the Gear.



MAINGEAR.COM

GAMING PERFORMANCE

Each of our hand-built systems are tested, benchmarked, and burned in to insure the ultimate gaming experience.

GAMING STYLE

Frag your friends in style! Our PCs are so slick you'll want them on your desktop instead of under your desk.

PRELUDE

- Silver Dragon Full-Tower Aluminum Case w/ Side Acrylic Window
- 420W Power Supply
- Sis 648 Chipset Motherboard
- Intel® Pentium 4 2.4GHz 512K 533MHz
- 512MB PC-2700 Kingston Memory
- Western Digital 80GB ATA100 7200RPM 8MB
- Black 1.44MB Floppy Drive
- Black 52x24x52x CD-R/RW
- Black 16X DVD-ROM
- nVidia GeForce FX 5600 256MB 8x AGP w/ DVI & S-Video
- Integrated Audio
- Integrated 10/100 LAN
- Microsoft Windows XP Home
- Black Microsoft Internet Keyboard
- Black Microsoft Intellimouse Explorer 3.0 Mouse
- Maingear 1-Year Onsite Warranty
- Tuned & Configured for High-Performance

$1180 FREE SHIPPING

ALPHA

- Coolermaster ATC-710 Case (not painted)
- 420W Power Supply
- Intel® E7205 Chipset Motherboard
- Intel® Pentium 4 2.8GHz 512K 533MHz FSB
- 512MB Dual Channel PC-2100 Kingston Memory
- Western Digital 80GB ATA100 7200RPM 8MB
- Black 1.44MB Floppy Drive
- Black 52x24x52x CD-R/RW
- Black 16X DVD-ROM
- nVidia GeForce FX 5600 256MB 8x AGP w/ DVI & S-Video
- Creative Labs Sound Blaster Live! 5.1
- Integrated 10/100/1000 Gigabit LAN
- Microsoft Windows XP Home
- Black Microsoft Internet Keyboard
- Black Microsoft Intellimouse Explorer 3.0 Mouse
- Maingear 1-Year Onsite Warranty
- Tuned & Configured for High-Performance

$1542 FREE SHIPPING

HARDCORE

- Coolermaster ATC-710 Case (Not Painted)
- 420W Power Supply
- Deluxe nForce2 chipset motherboard
- AMD Athlon XP 3000+ 400FSB
- 512MB Dual Channel PC-3200 CL2 CORSAIR XMS Memory
- Western Digital 120GB ATA100 7200RPM 8MB
- Black 1.44MB Floppy Drive
- Black 52x24x52x CD-R/RW
- Black 16X DVD-ROM
- ATI RADEON 9800 PRO 128MB DDR 8x AGP w/DVI & S-Video
- Creative Labs Sound Blaster Audigy 2.0
- 2x Integrated 10/100 LAN
- Microsoft Windows XP Home
- Black Microsoft Internet Keyboard
- Black Microsoft Intellimouse Explorer 3.0 Mouse
- Maingear 1-Year Onsite Warranty
- Tuned & Configured for High-Performance

$1923 FREE SHIPPING

F131

- NEW! Coolermaster Wave Master TAC-T01 Aluminum Case w/420W Power Supply
- Intel 875P Chipset Motherboard
- Intel Pentium 4 3.0GHz 512K 800MHz FSB
- Hyperthreading Technology
- 512MB Dual Channel PC-3200 CL2 CORSAIR XMS Memory
- Western Digital 120GB ATA100 7200RPM 8MB
- Black 1.44MB Floppy Drive
- Black 52x24x52x CD-R/RW
- Black 16X DVD-ROM
- nVidia GeForce FX 5900 Ultra 256MB 8x AGP w/DVI & S-Video
- Creative Labs Sound Blaster Audigy 2.0
- Integrated 10/100/1000 Gigabit LAN
- Microsoft Windows XP Home
- Black Microsoft Internet Keyboard
- Black Microsoft Intellimouse Explorer 3.0 Mouse
- Maingear 1-Year Onsite Warranty
- Tuned & Configured for High-Performance

$2264 FREE SHIPPING

MAINGEAR

DESKTOPS ▪ X-CUBE ▪ LAPTOPS

WWW.MAINGEAR.COM

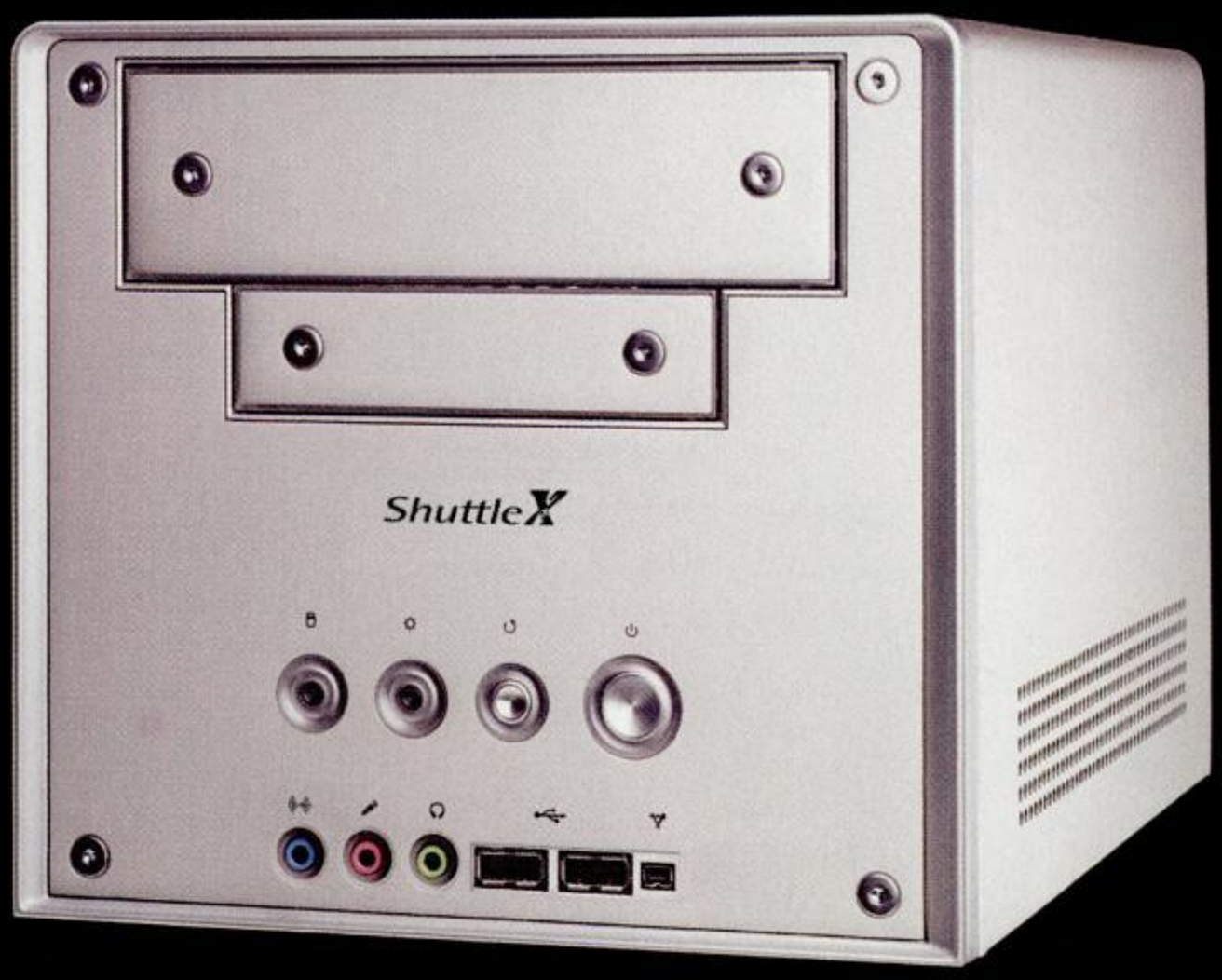
We are available Mon - Fri 9am to 9pm EST, Sat 10am to 6pm EST

You can call us toll-free at: 1.877.398.3248 or 24/7 at sales@maingear.com

You can also reach our support team at: support@maingear.com

POLICIES: We also offer a 30 day money back guarantee on all of our systems. You can return the system if not completely satisfied within 30 days. All systems returned are subject to have a 15% restocking fee. All returned merchandise must be accompanied by its original packaging, accessories and manuals. Your must contact MAINGEAR customer support for an RMA# prior to return of merchandise. Defective merchandise will be replaced with a like item, upon return of the defective merchandise. MAINGEAR is not responsible for any damages caused by either internal or external equipment, shorted connections or components not installed by or purchased from MAINGEAR. MAINGEAR is not responsible for damages to any components or loss of any data inadvertently caused by products, under normal or abnormal use, including those purchased from MAINGEAR. MAINGEAR will not replace, repair or refund any purchase if an item's serial number does not match what was originally sold. Limited warranty does not cover damages or defects cause by: Shipping (other than related to the original shipment from MAINGEAR), improper installation, misuse, modifications, unauthorized repair, adjustments, or excessive electrical power. Warranty and 30-Day money back guarantee only applies to system/s sold directly by MAINGEAR or an authorized dealer. Monitor and speakers sold separately unless marked otherwise. Prices do not include tax and shipping.

Copyrighted material



The new XPC is here

The Small Form Factor Leader

XPC SB61G2

- Supports 800FSB w/HyperThreading
- AGP8X slot, PCI slot
- Dual Channel DDR400
- Dual SerialATA connectors
- Only 11.7" x 7.8" x 7.2", less than 10lbs

Shuttle

Connecting Technologies

www.shuttle.com

Copyrighted material

ATACOM.COM

Toll Free: 877-4282266(4ATACOM)

Go to www.atacom.com for all these hot prices!

FIC ATI 9800 Pro 256MB DDR
Video Card Unleashed!
Harness the complete range of premium ATI Radeon cards. Whether you require the flexibility of the 9200, the rock solid 9600, or the extreme unleashed performance of the 9800, ATACOM is your #1 ATI source!

"Unholy Speed!" OCZ Technology PC3700
466Mhz CL 2.0 Dual Channel with
Gold-plated heatspreader

- Shuttle XPC SB61G2 Barebone Intel Socket 478 800MHz FSB $344
- 12 Inch UV (Ultra-Violet/Black Light) Cold Cathode Light $8
- Dell Axim X5 USB Sync and Charge Cable $21
- USB 6-in-1 Silver External Flash Memory Card Reader $15
- Lite On 16X DVD-ROM/ 48X CD-ROM Internal Drive $37
- Asus V9520TD GeForce FX5200 128MB 8X with TV-OUT/DVI $94

EL and UV
Rounded IDE
and Floppy Cables
From $6

Mid-Tower
Case with
350W P.S
Front I/O Ports,
Thermometer, Flip-down
CD-ROM Doors, Large Clear
Window Side Panel
$69

Creative Inspire 6.1
6600 Positional
Audio Speaker
System with
DirectSound
$84

Palm Light Up
Stylus for Palm
M500/505/515
$14

NEC ND-1300A
4X DVD±R 2x-2.4 DVD±RW
10X12X40X CD-R/RW
$199

Samsung CompactFlash
256MB CF Card
$65

Asus P4C800-E
We carry
a full line of
Asus products.

64MB to 2GB
USB Flash
Memory
Pen Drives
From $18

Barebone System

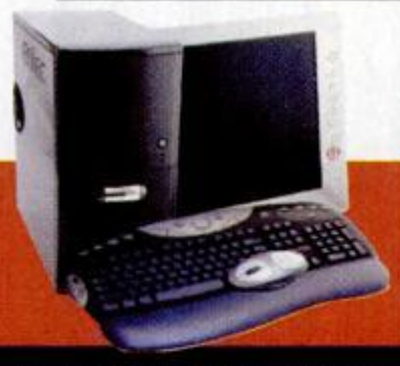
FIC ICE-Cube
- Intel 845GE Chipset
- Support Intel P4 478 (400/533MHz)
- Support DDR333 PC2700 Memory
- AC'97 6 Channel Audio Onboard
- On-board 10/100 Ethernet LAN
- 1 PCI Card expansion Slot
- 1 AGP 4x Expansion Slot
- 3x Firewire 1394 Ports & 4x USB1.1 Ports
- 1x SPDIF Input port
- On-Board Video
- Aluminum Case
- Dimensions: 294.5 x 135 x 260mm
- Monitor,Keyboard & Mouse Optional

$239 Complete System with P4 2.4GHz CPU, 512MB Memory & 40GB HD for $649

Quiet System

- Intel 845GE Chipset Motherboard
- Intel P4 2.4GHz 512K Cache 533FSB CPU
- 512MB DDR333 Memory
- 80GB 7200RPM Ultra ATA Hard Drive
- Black 52x24x52x16x CD-RW/DVD Combo Drive
- Black 1.44MB FDD
- Intel Integrated Graphics
- 6 Channel Audio
- 10/100 Ethernet LAN
- Mid-Tower Case With 380W Power Supply
- Add Microsoft Windows XP Home @ $98
- 1 Year Limited Warranty
- Monitor,Keyboard & Mouse Optional

$1099 Upgrade to P4 2.8GHz $1299
Upgrade to P4 3.06GHz $1549



intel inside pentium 4

intel premier PROVIDER ATACOM

XGamer

- SIS655 Chipset Motherboard Supports Dual Channel Memory (Serial ATA / ATA133/ AGP8X/ 1394/ USB2.0 Support)
- Intel P4 3.06GHz CPU/ 512MB DDR400 Memory
- 80GB 7200RPM. Ultra ATA Hard Drive
- 16x DVD Drive
- 52x/24x/52x CD-RW Drive
- 1.44MB FDD
- ATI Radeon 9700 Pro 128MB Video Card
- AC'97 6 Channel Audio
- 10/100 Ethernet LAN
- Wireless Keyboard and Mouse (Same Color as Case)
- Color Aluminum Mid-Tower Case with 350W Power Supply
- Add Microsoft Windows XP Profesional @ $164
- 1 Year Limited Warranty

$1999 Atacom recommends OCZ EL Dual-Channel DDR for eXtreme Gaming PC systems.

We accept Visa, MasterCard, American Express and Discover in addition to check, cash, money order and wire transfer.

All pricing, policies, specifications, and item availability are subject to change at any time.

Copyrighted material

Monarch Computer Systems

AMD Athlon XP

AMD Athlon MP

Visit www.monarchcomputer.com/maxpc for advertised specials.

AMD Athlon™ XP 3000+† (400 FSB)

$259.00

AMD Athlon™ XP Processors From 2000 to 3200 (400 FSB)

FREE TECH SUPPORT! NO WAIT EVER!

Buy Online or by phone:
1-800-611-0875
1-8-MONARCHPC

Paypal - Visa - Mastercard - Discover - AMEX

ATTENTION ALL PC ENTHUSIASTS!

Monarch Computer has the LOWEST PRICE and the BEST SELECTION!

Motherboard Combos

Gigabyte GA-7DPXDW-P RAID Mainboard with AMD Athlon™ MP 2800+

Only $499

Abit NF7-S NForce2 (Ver. 2) Mainboard with AMD Athlon™ XP 3200+†† 400 FSB

Only $583

MSI KT 400 Mainboard with AMD Athlon™ XP 3000+***

Only $373

MSI KM2M Combo-L Mainboard with AMD Athlon™ XP 2200+*

Only $144

Mainboard - Processors - Heatsink and Fan with Memory Options
FREE INSTALLATION AND TESTING - LASTEST BIOS loaded for easy upgrades
AMD Athlon™ XP and AMD Athlon™ MP Motherboard Combos Available

AMD Barebone Systems

Go to www.monarchcomputer.com. select Barebones from the Menu. Choose AMD Athlon™ XP or AMD Athlon™ MP. Then configure your barebones online or call 1-8-MONARCHPC.

Lian-Li PC-61 Black Case w/460W PS
Asus NForce2 A7N8X Deluxe (Ver. 2) MB
AMD Athlon™ XP 2500+ Processor
with Quantispeed™ Architecture**

Only **$497**

Lian-Li PC-71 Black Case w/460W PS
Tyan Tiger (S2466-4M) MB
(1) AMD Athlon™ MP 2400+ Processor
with Quantispeed™ Architecture

Only **$629**

Monarch Tower 1150 w/300W PS
MSI KM2M Combo-L MB
AMD Athlon™ XP 2200+ Processor
with Quantispeed™ Architecture*

Only **$207**

Lian-Li PC 6070A Ultra Quiet w/460W PS
Abit/Asus NForce2 (Ver. 2) MB
AMD Athlon™ XP 3000+ Processor (400 FSB)
with Quantispeed™ Architecture†

Only **$680**

QUICK QUOTES! In 5 minutes - 24/7 HUGE SELECTION

NEW - NEW - NEW
ASUS NForce 3 SK8N
AMD 64 Motherboard
IN STOCK NOW!!!

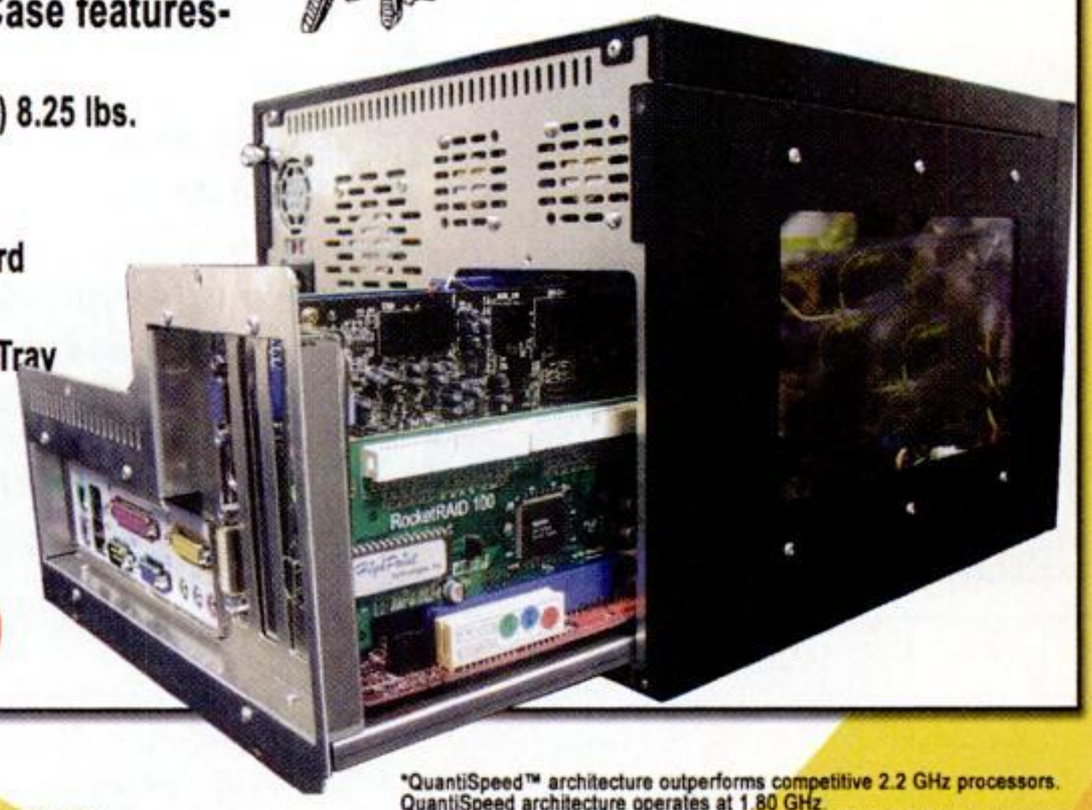
The Hornet

by Monarch Computer

This Exclusive Micro-ATX Case features-

- WxHxD: 11" x 9" x 13"
- Dry weight (Chassis + PS) 8.25 lbs.
- Open Architecture (Micro-ATX Form Factor)
- FULL SIZE AGP Video Card
- 3 PCI Slots
- Removable Motherboard Tray
- 2 Temp. Monitors
- 2 Internal 3.5 HDD bays
- Removable handle for easy mobility

Barebones Starts @ **$259**



Lease financing available for purchases as low as $1000.

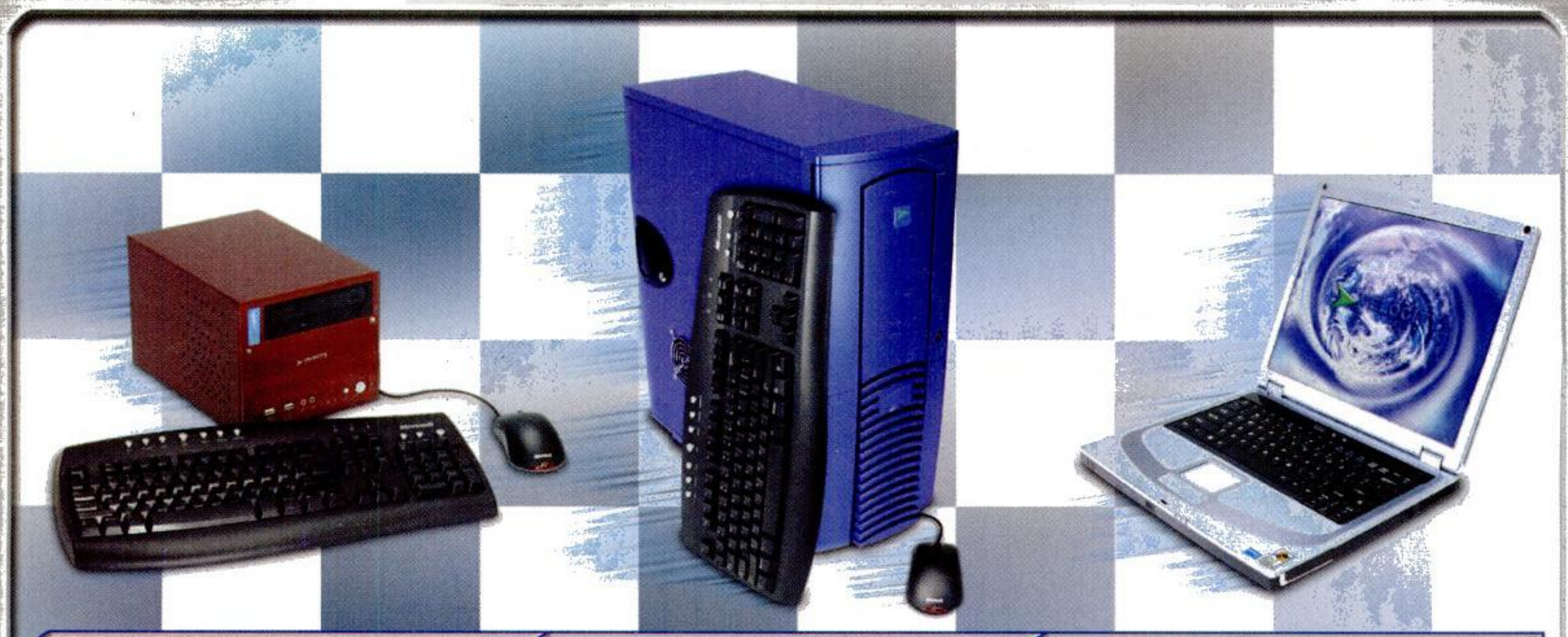
Prices subject to change without notice. Monarch Computer not responsible for typographical errors.

All brands and product names are trademarks or registered trademarks of their respective companies.

*QuantiSpeed™ architecture outperforms competitive 2.2 GHz processors. QuantiSpeed architecture operates at 1.80 GHz.
**QuantiSpeed™ architecture outperforms competitive 2.5 GHz processors. QuantiSpeed architecture operates at 1.83 GHz.
*** † QuantiSpeed™ architecture outperforms competitive 3 GHz processors. QuantiSpeed architecture operates at 2.16 GHz.
†† QuantiSpeed™ architecture outperforms competitive 3.2 GHz processors. QuantiSpeed architecture operates at 2.20 GHz.

Copyrighted material

VELOCITY™ micro



Voyager™

- Intel® Pentium® 4 3.06GHz, 512K Cache, 533Mhz
- Zalman® Copper CPU Heatsink & Fan System
- XP4 Chassis - Blast Red Aluminum Cube Case
- Intel® i845GE Series Motherboard with DDR333
- 512MB Kingston® PC3000 DDR370 Memory
- 128MB ATI® Radeon™ 9700 Pro Video
- 180GB WD 7200rpm Hard Drive, 8MB Cache
- Black Plextor® DVD/CD-RW Combo Drive
- Integrated 5.1 Channel Sound System
- Integrated 10/100MBps Network Adapter
- Black Microsoft® Multimedia Keyboard
- Black Microsoft® Optical USB Scroll Mouse
- Microsoft® Windows® XP Home w/SP 1 and CD
- Personalized Custom System Restore Disks
- Custom Owners binder w/complete documentation
- **1 Year Toll Free 24/7 Support & On-Site Service**
- Careful hand wiring and neatly folded cables
- Individually Performance Tuned & Optimized

$1940

Vector™ VX

- Intel® Pentium® 4 3.0GHz, 512k Cache, 800MHz
- Intel® Certified High Performance Heatsink/Fan
- VX Blue Case - Full Tower with front USB 2.0
- MSI™ Neo2 Intel® 865PE Series Motherboard
- 512MB Kingston® PC3200 DDR400 memory
- 128MB ATI® Radeon™ 9600, 8x AGP Video
- 80GB 7200rpm ATA/100 Hard Drive, 8MB Cache
- Black 16x/48x Lite On® DVD-ROM
- Black 52x/24x/52x Lite On® CD-RW
- Black 1.44MB Floppy Drive
- Integrated 5.1 Channel Sound System
- Integrated 10/100 MBps Network Adapter
- Black Microsoft® Multimedia Keyboard
- Black Microsoft® Optical USB Scroll Mouse
- Microsoft® Windows® XP Home w/SP 1 and CD
- Personalized Custom System Restore Disks
- Custom Owners binder w/complete documentation
- **1 Year Toll Free 24/7 Support & On-Site Service**
- Careful hand wiring and neatly folded cables

$1495

NoteMagix™ B50

- Intel® Pentium-M® 1.6GHz, 1MB Cache
- Premium Cooling System w/Arctic Silver III
- Intel® 855PM Motherboard with DDR, ICH4-M
- 15" SXGA+ TFT Active Matrix TFT Display
- 64MB ATI® Mobility Radeon 9000 AGP Video
- 512MB PC2700 DDR333 SODIMM Memory
- 40GB 5400rpm ATA/100 Hard Drive
- 8x DVD + 24x/10x/24x CD-RW Combo Drive
- Integrated 5.1 Channel Sound System
- Integrated 56K V.92 Modem
- Integrated 10/100MBps Network Adapter
- Integrated Intel® 802.11b WiFi Wireless Adaptor
- 3 USB 2.0 ports, Two 1394 IEEE FireWire
- 8-Cell Smart Li-Ion Battery, 58Wh
- Microsoft® Windows® XP Home w/SP1 and CD
- Personalized Custom System Restore Disks
- **1 Year Toll Free 24/7 Support & On-Site Service**
- Careful hand assembly and testing
- Individually Performance Tuned & Optimized

$2520

intel inside
pentium 4

Powered by Intel® Pentium® 4 Processors

The Velocity Micro Difference?

It's our absolute obsession with complete customer satisfaction and attention to detail. Our numerous Editor's Choice awards are a testament to our exceptional performance, craftsmanship, and value, but our 99.4% customer satisfaction rating is our proudest achievement. If you look at the company you want to build your next computer as much as you look at the components inside, you will discover the difference is clear, it's Velocity Micro!

Every System is Backed by Advanced 24/7 Toll Free Tech Support and Priority Next Day On-Site Service.

1-800-303-7866
www.velocitymicro.com

Intel, Intel Inside, the Intel Inside logo and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. © 2003 by Velocity Micro

WWW.iBUYPOWER.COM

ZILLION PRO

- ~ AMD Athlon XP Processor 2400+ with QuantiSpeed Architecture outperforms competitive 2.4GHz processors
- ~ Raidmax® Scorpio Aluminum Tower Case with 420 Watt Power + See Through Window + Sound Activated Neon Light
- ~ NVIDIA® nForce™2 Ultra-400 AGP 8X Motherboard with USB 2.0
- ~ 512MB Dual Channel DDR400 PC-3200 Memory
- ~ WD 120GB 7200RPM Hard Drive w/ 8MB Cache
- ~ 16x DVD-ROM Drive, 52x24x52 CD-RW Drive & 1.44MB Floppy Drive
- ~ NVIDIA® GeForce™ FX5900 128MB DDR 8x AGP Video Card
- ~ NVIDIA® SoundStorm Audio with Dolby Digital 5.1 Encoding
- ~ NVIDIA® 10/100 Ethernet LAN
- ~ Klipsch GMX D-5.1 Dolby Surround Sound Speakers
- ~ 19" ViewSonic Perfect Flat E90F+SB .21H mm Monitor
- ~ Scrolling Internet Mouse
- ~ MultiMedia Keyboard
- ~ Microsoft® Windows® XP Professional Edition
- ~ Free Norton AntiVirus 2003 CD
- ~ Free 1-Year 24/7 ***i-Care*** Deluxe Technical Support + On-Site Service

$ 1699

AMD Athlon XP Processor 3200+	$ 2099
AMD Athlon XP Processor 3000+	$ 1899
AMD Athlon XP Processor 2800+	$ 1799
AMD Athlon XP Processor 2700+	$ 1769

BACK TO SCHOOL

- ~ Intel® Pentium® 4 Processor 2.4GHZ <800MHz Front Side Bus>
- ~ Intel® 865PE Chip Pentium® 4 DDR400 800MHz FSB 8x AGP Main Board w/USB 2.0
- ~ 512MB Dual Channel DDR400 PC3200 Memory
- ~ 80GB 7200RPM Ultra ATA-133 Hard Drive
- ~ 52x24x52 CD-RW Drive
- ~ 64MB NVIDIA® GeForce-4 MX440 8x AGP Video
- ~ 5.1 Channel Surround Sound & 600Watt PMPO Subwoofer Speakers
- ~ 10/100 Network LAN
- ~ 19" Viewsonic E90 .23H mm Monitor
- ~ Scrolling Internet Mouse & MultiMedia Keyboard
- ~ Microsoft® Windows® XP Home Edition
- ~ FREE Norton AntiVirus 2003 CD
- ~ FREE 1-Year 24/7 ***i-Care*** Deluxe Technical Support + On-Site Service

$ 879

Intel® Pentium® 4 Processor 3.2 GHZ <800MHz FSB>	$ 1379
Intel® Pentium® 4 Processor 3.0 GHZ <800MHz FSB>	$ 1179
Intel® Pentium® 4 Processor 2.8 GHZ <800MHz FSB>	$ 999
Intel® Pentium® 4 Processor 2.6 GHZ <800MHz FSB>	$ 899

iBUYPOWER

TOLL FREE 888. 462.3899

Price, Specification and terms are subject to change without notice. Picture may differ from actual products. We are not responsible for errors in typography and/or photography. 30-day money back guarantee does not include opened software, parts, or special order merchandise.

Original shipping and handling fee along with return shipping charge are non-refundable. Products returned after 30 days or in a non-refundable condition are subject to a restocking fee. * 3 year limited warranty includes 3 years labor and 1 year parts only.

Sales Hour: Mon~Fri 7:30AM-6:00PM, Sat 10AM-3PM PST
602 Monterey Pass Rd., Monterey Park CA 91754
Tel: (626) 281-8262 Fax: (626) 281-0767
All Prices effective on July 15, 2002

Copyrighted material

ebuyer

Make the right decision
http://www.ebuyer.com

BELKIN *Connecting people with Technology*

2-Port KVM Switch

QuickFind Code: 39510

$35.62

350va 8 Output UPS

QuickFind Code: 06215

$37.39

D-Link Building Networks for people

D-Link Wireless 22Mbps Access Point

QuickFind Code: 11176

$71.04

D-Link Hi-Speed USB 2.0 4-Port Hub

QuickFind Code: 11193

$25.45

D-Link 2pt USB 2.0 Cardbus Adapter

QuickFind Code: 11242

$40.81

HOT DEALS Direct from ebuyer

ECS Elite Group

Elite K7S5aPRO Skt A Mainboard

$43.61

QuickFind Code: 69503

Samsung

Samsung 128MB SmartMedia Card

$25.63

QuickFind Code: 76379

Linksys

Wireless G 54Mbps Cable DSL Router

$115.34

QuickFind Code: 62827

Canon

Canon I850 Inkjet USB/Parallel Printer

$135.47

QuickFind Code: 61081

Build your own base system for less than $310

Product Description	QuickFind Code	Price
AMD XP 1800+ CPU OEM	60686	$56.31
Coolermaster Heatsink & Fan	60680	$8.74
Asus A7N266-VM Mainboard	48207	$69.06
Ebuyer Extra Value 256MB DDR Ram	60727	$26.82
Western Digital Protege 20Gb HD	24816	$61.25
Sony DDU1621 16x40x DVD Drive	73819	$35.25
Sony 1.44 Floppy Drive - OEM	60745	$10.99
Ebuyer Extra Value Tower Case - 300w	60720	$21.69
SP-110300w Flat Panel Speakers	60757	$7.85
Ebuyer Extra Value Keyboard	60714	$4.95
Ebuyer Extra Value Wheel Mouse	60709	$2.50

SONY

Western Digital

ASUS

AMD

COOLER MASTER

SECURE PAYMENT PRODUCT QUICK FIND

ebuyer offers the best in computer hardware and software.
Find the most efficient and competitive solutions at http://www.ebuyer.com

up to date prices available from www.ebuyer.com | products subject to availability while stocks last | images are representitive only | errors and omissions excluded | all prices are subject to change | see online for full terms and conditions
6900 West Morelos Place, Suite 2, Chandler, Arizona 85226

Copyrighted material

GAMER X-TREME LIGHTNING PRO — $ 865

- NVIDIA nForce-2 Motherboard w/ 8X AGP
- 512MB PC400 PC3200 DDR Memory
- 80GB 7200RPM Ultra ATA133 Hard Drive
- NVIDIA Geforce-FX 5200 8X AGP 128MB DDR w/ TV out
- 16X DVD-ROM & 52X24X52 CD-RW Drive
- Creative Lab Sound Blaster Live 5.1 Surround Sound
- 800Watt Stereo Subwoofer Speaker System w/ Matching Neon Light
- Viewsonic 19" E90 .23MM SVGA Monitor
- 56K Modem, 1.44MB Floppy, Keyboard & Mouse
- **Turbo X-Dreamer Case 350Watt with See Through Windows and Sound Activated Neon Light.**
- 6 Cool Custom Colors to Choose From
- Microsoft® Windows® XP Home Edition
- Microsoft® Work 7.0
- Free First Year On Site Service plus 24/7 Tech Support

AMD Athlon™ XP Processor 2800+[1]	$ 999	CL801
AMD Athlon™ XP Processor 2700+[4]	$ 955	CL802
AMD Athlon™ XP Processor 2600+[5]	$ 915	CL803
AMD Athlon™ XP Processor 2500+[6]	$ 899	CL804
AMD Athlon™ XP Processor 2400+[7]	$ 895	CL805
AMD Athlon™ XP Processor 2200+[8]	$ 885	CL806
AMD Athlon™ XP Processor 1800+[9]	$ 865	CL807

GAMER PERFORMANCE PRO — $ 975

- NVIDIA nForce-2 Motherboard with 8X AGP
- 512MB PC3200 400Mhz DDR Memory
- 80GB 7200RPM Ultra ATA100 Hard Drive
- ATI® Radeon™ 9600 Pro 8X AGP 128MB DDR w/ TV Out & DVI
- 16X DVD-ROM
- 48X16X48 CD-RW Drive
- 3D Wave Sound & 450 Watt Subwoofer System
- Viewsonic 19" E90 .23MM SVGA Monitor
- 56K Modem, Floppy Dr, Internet Keyboard & Mouse
- **Aluminum** SX1030 Soho Server Tower Case 425Watt w/ MOD "See Through Windows" & Neon Light
- 6 Cool Custom Colors to Choose From
- Microsoft® Windows® XP Home Edition
- Microsoft® Work 7.0
- Free First Year On Site Service plus 24/7 Tech Support

AMD Athlon™ XP Processor 2800+[1]	$ 1099	CXD801
AMD Athlon™ XP Processor 2700+[4]	$ 1065	CXD802
AMD Athlon™ XP Processor 2600+[5]	$ 1028	CXD803
AMD Athlon™ XP Processor 2500+[6]	$ 1015	CXD804
AMD Athlon™ XP Processor 2400+[4]	$ 1009	CXD805
AMD Athlon™ XP Processor 2200+[8]	$ 995	CXD806
AMD Athlon™ XP Processor 1800+[9]	$ 975	CXD807

XTREME GAMER PLATINUM PRO — $ 1529

- NVIDIA nForce-2 Motherboard with 8X AGP
- 1GB PC400 PC3200 DDR Memory
- 120GB 7200RPM Ultra ATA133 Hard Drive
- Nvidia Geforce-FX 5900 128MB DDR Video Card w/ Tv out & DVI
- 16X DVD-ROM & 52X24X52 CD-RW Drive
- Creative Lab Sound Blaster Audigy 2.6.1 w/ IEEE
- Creative Cambridge Desk Top Theater 5.1 Inspire 5200 5.1 Surround Sound System
- **19" Viewsonic E90F+SB Two Tone Silver/Black .21MM 1800 x 1400 SVGA w/ Ultra Bright Technology**
- 56K Modem & 1.44 Floppy Drive
- Silver PS2 Internet Keyboard
- Microsoft® Optical intelli Explorer Mouse
- **Aluminum** SX1030 Soho Server Tower Case 425Watt w/ MOD "See Through Windows" & Neon Light
- 6 Cool Custom Colors to Choose From
- Microsoft® Windows® XP Home Edition
- Microsoft® Work 7.0
- Free First Year On Site Service plus 24/7 Tech Support

AMD Athlon™ XP Processor 3200+[1]	$ 1935	CD801
AMD Athlon™ XP Processor 3000+[2]	$ 1725	CD802
AMD Athlon™ XP Processor 2800+[3]	$ 1635	CD803
AMD Athlon™ XP Processor 2700+[4]	$ 1589	CD804
AMD Athlon™ XP Processor 2600+[5]	$ 1549	CD805
AMD Athlon™ XP Processor 2500+[6]	$ 1535	CD806
AMD Athlon™ XP Processor 2400+[7]	$ 1529	CD807

CyberPower Inc.

VISA MasterCard DISCOVER

Price subject to change without notice. •

4802 Little John St. Baldwin Park, CA 91706
Tel: (626)813-7730 • Fax: (626)813-3810
Technical Support (877)876-4965
Hour:Mon-Fri 8:30A.M. – 6:00P.M.
Sat 9:30A.M. – 3:00P.M.

1 QuantiSpeed™ architecture outperforms competive 3.2GHz processors, QuantiSpeed™ architecture operates at 2.2GHz.
2 QuantiSpeed™ architecture outperforms competive 3.0GHz processors, QuantiSpeed™ architecture operates at 2.17GHz.
3 QuantiSpeed™ architecture outperforms competive 2.8GHz processors, QuantiSpeed™ architecture operates at 2.083GHz.
4 QuantiSpeed™ architecture outperforms competive 2.7GHz processors, QuantiSpeed™ architecture operates at 2.167GHz.
5 QuantiSpeed™ architecture outperforms competive 2.6GHz processors, QuantiSpeed™ architecture operates at 2.083GHz.
6 QuantiSpeed™ architecture outperforms competive 2.5GHz processors, QuantiSpeed™ architecture operates at 1.83GHz.
7 QuantiSpeed™ architecture outperforms competive 2.4GHz processors, QuantiSpeed™ architecture operates at 2.0GHz.
8 QuantiSpeed™ architecture outperforms competive 2.2GHz processors, QuantiSpeed™ architecture operates at 1.8GHz.
9 QuantiSpeed™ architecture outperforms competive 1.8GHz processors, QuantiSpeed™ architecture operates at 1.533GHz.

ORDER TOLL FREE (800)707-0393

Copyrighted material

PINNACLE SYSTEMS

INTRODUCING PINNACLE EDITION 5

Professional Video Editing & DVD Authoring Software

Edition 5 is the world's first fully integrated realtime video editing & DVD Authoring solution built specifically for video hobbyists and professionals alike. With Edition 5 software you'll be able to create video productions with multiple layers of full motion video, awesome 3D FX & transitions plus professional level color correction ALL IN REAL-TIME! When your video is done, Edition's DVD Wizard will guide you through the DVD Authoring process directly from the timeline.

UNPRECEDENTED REALTIME PERFORMANCE

- Edition's revolutionary realtime architecture leverages the power of your CPU & 3D Graphics Card to deliver up to 5 layers of full motion video with filters & Hollywood-style 3D effects in realtime!

- Background Processing means you never have to stop editing! Edition is truly multi-tasking so you can continue to work on your production while it is processing the work completed!
- InstantSave tracks every step so you'll never lose your work

PLUS, TRULY INTEGRATED DVD AUTHORING

Edit, author & burn DVDs direct from your editing timeline!

- Easily add chapter points & DVD navigation to your timeline
- Grab frames from your video for use as menus & buttons
- Use clips from your project for motion menus & buttons
- Supports all current formats and brands of DVD burners

PINNACLE EDITION 5 Software - $649.95

PINNACLE EDITION 5 PRO - $949.95

PRO Bundle includes the Pinnacle Edition 5 software, Breakout Box with Analog & DV in/out plus AGP card for realtime analog output and preview on an NTSC monitor

Trade-In & Upgrade Your Video Editing System to PINNACLE EDITION 5 PRO for $499.95- Call for Details!

THE ELECTRONIC MAILBOX

Videoguys.com

20 YEARS

The Electronic Mailbox has been the experts in video editing and production equipment for the last 20 years! An honor that has affectionately dubbed us "The Videoguys."

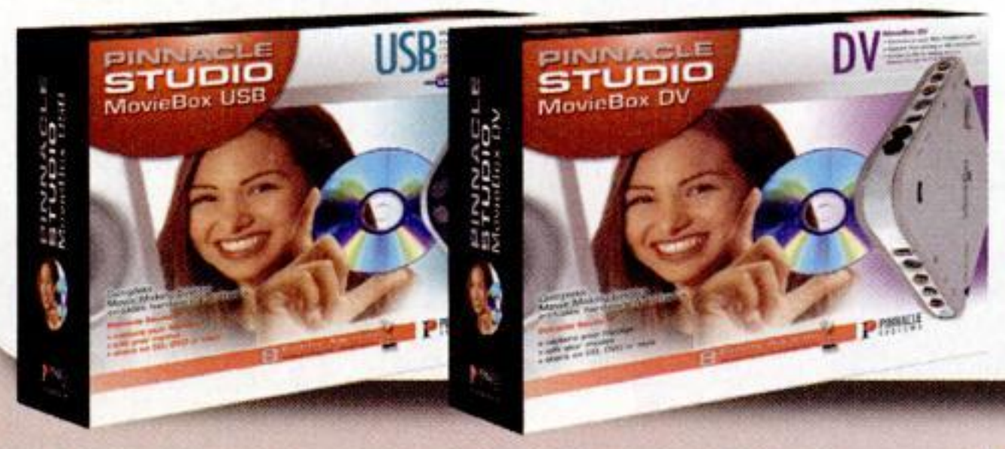
Our commitment today is to provide you with the same great service & support that we have shared with thousands of customers every year for the last two decades. Our knowledgeable advice, FREE tech support, and 30-day money-back guarantee are still unmatched in the industry. Check out our web site – Videoguys.com for system recommendations, reviews & helpful tweaks to optimize your PC for video editing! We have everything you need to capture, edit & create DVDs!

PINNACLE STUDIO MovieBox DV & USB

Plug & Play Movie Making with Award Winning Software

Pinnacle's new STUDIO MovieBox editing systems deliver everything you need to capture video to your PC to get started in video editing. Both packages include an external, plug & play breakout box for all of your video input & output connections plus the award-winning Pinnacle Studio 8 software for video editing, special effects, titles and integrated DVD authoring!

- MovieBox USB captures S-Video & Composite through your USB port
- MovieBox DV converts S-Video & Composite to DV for FireWire equipped PCs

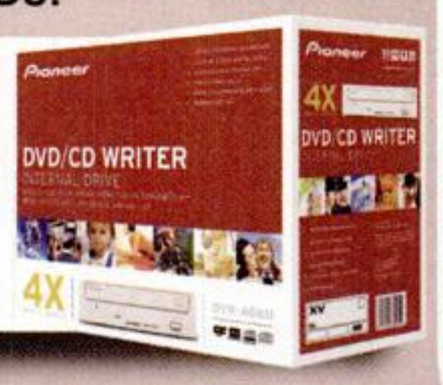


Your Choice $199.95

NEW! Pioneer DVR-A06

Introducing Pioneer's new DVD Burner with multi-format (-/+) support and super-fast DVD write-speeds!

IN STOCK!



800-323-2325

• FREE Tech Support • 30-Day Money-Back Guarantee

E-mail: sales@videoguys.com • tech@videoguys.com • The Electronic Mailbox, 10-12 Charles St., Glen Cove, NY 11542 • 516-759-1611 • Fax 516-671-3092

Copyrighted material

RAIDMAX

SCORPIO

- Aluminum Light weight Chassis
- USB 2.0version and IEEE 1394
- 10 Driver Bays 4 x 5.25" External Driver Bay
  2 x 3.5" External Driver Bay
  4 x 3.5" Internal Driver Bay
- 2 x Transparent Temp-Control Fans
- 1 x Transparent Bright LED 3 Color Fan
- Stylish Face Panel with Bright LED
- Unique Blade Style Fan Grill With Filter
- Premod See Through Side Window
- Termal Control Fans Adjust speed Automatically and Keep Your System Quite

RAIDMAX

WWW.RAIDTRONIC.COM
WWW.BUYRAIDMAX.COM

DIRECTRON.COM MA·LABS GAMEVE.COM

PC CLUB SED INTERNATIONAL BananaPC.com CENTRAL COMPUTER SYSTEMS AMAX LINK COMPUTER newegg iBUYPOWER

www.directron.com • www.malabs.com • www.gameve.com • www.pcclub.com • www.sedonline.com • www.bananapc.com
www. centralcomputer.com • www.max.com • www.ajump.com • www.linkcomputer.com • www.newegg.com • www.ibuypower.com

Copyrighted material

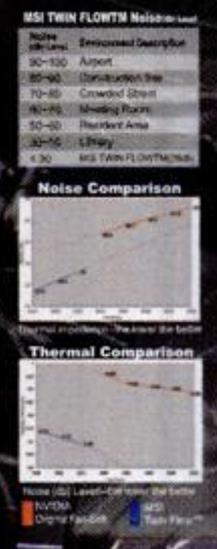
The way it's meant to be played

nVIDIA. GeForce FX

MSI EXCLUSIVE COOLING GEAR!!!

MSI TWIN FLOW™ COOLING SYSTEM

- **Ultra Silence**
  -- 26db Fan Noise Lower
- **Ultra Cooling**
  -- 8°C Heat Less
- **Ultra Slim**
  -- Slim & Sleek Fan-sink Design
- **Ultra Endurance**
  -- Long Fan Endurance Guarantee



(All test figures are based on the comparison with NVIDIA original fan-sink)

Applied to FX5900 Series

Blazing Your Vision, MSI FX Series

MSI Re-awards the Worldwide No.1 VGA Card Manufacturer.

~ Souces: Goldman Sachs Global Equity Reseach~March 06, 2003

MSI FX5900 Series

- Powered by NVIDIA® GeForce™ FX 5900 Ultra/ FX 5900 GPUs
- 128MB/256MB DDR Support
- MSI Twin Flow™ Cooling System Support
- NVIDIA® CineFX™ Engine 2.0
- NVIDIA® Intellisample™ High-Resolution Compression Technology (HCT)
- Cutting-edge NVIDIA® UltraShadow™ Technology
- Microsoft® DirectX® 9.0 Support

MSI FX5600 Series

- Powered by NVIDIA® GeForce FX 5600 GPU
- 128MB/256MB DDR Support
- MSI E³ PowerCube Support
- NVIDIA® CineFX™ Engine
- NVIDIA® Intellisample HCT
- Microsoft® DirectX® 9.0 Support and OpenGL® 1.4 Optimization

MSI FX5200 Series

- Powered by NVIDIA® GeForce FX 5200 GPU
- 64MB/128MB DDR Support
- MSI T.O.P. TECH II Cooling System Support
- NVIDIA® CineFX™ Engine
- NVIDIA® Intellisample HCT
- Microsoft® DirectX® 9.0 Support and OpenGL® 1.4 Optimization

* All functions above are optional for all of MSI products. * MSI is a trademark of Micro-Star Int'l Co., Ltd. * Specifications are subject to change without notice. * All brand names are registered trademarks of their respective owners. *Any configuration other than original product specification is not guaranteed PMKTGVGAFXPOSTER-030523

* NVIDIA, the NVIDIA eye logo, The way it's meant to be played logo, CINEFX, GEFORCE, INTELLISAMPLE and ULTRASHADOW are registered trademarks and/or trademarks of NVIDIA Corporation in the United States and other countries and are used under license to MSI from NVIDIA Corporation.

MSI Multimedia
MSI
MICRO-STAR INTERNATIONAL
901 Canada Ct.
City of Industry, CA 91748
Tel: 626-913-0828
Fax: 626-913-0818

Beyond 3D

Copyrighted material

SVC.com

cool products.
hot prices.

Silicon Valley Compucycle, 876 The Alameda, San Jose, CA 95126 telephone > 408 292 SVC2 fax > 408 292 5295 web > http://svc.com

CD Storage

$12.99 and up

SVC has a wide range of CD Storage products including breifcase style units and stackable one-touch cases as seen in Staples and Brookstone

L.I.S. LCD Front Panel

$79.99

This multifunction two-line LCD display is highly customizable, and shows information from MBM5, Windows and Hardware Info, Winamp, real time CPU and RAM usage and more.

Rounded Drive Cables

$0.99 and up

SVC has the widest selection and lowest prices on rounded cables. Floppy, IDE, and SCSI cables in every possible color, including seven different UV reactive colors!

SVC Laser Cut Grilles

$0.99 and up

With over 100 different styles and colors starting at $0.99, why buy grilles anywhere else? Look for our exclusive Laser Etched Grilles.

DFI LANPARTY NFII ULTRA

$169.99

Make your presence be known at the next LAN party with nForce2 technology and its UV reactive qualities. Free 12" UV CCFL with each order!

Thermalright Copper Heatsinks

$9.99 and up

Thermalright coolers are consistently rated as the best performing heatsinks. As the number one distributor, SVC has the lowest prices online or offline, guaranteed.

Quad LED Fans

$2.49

SVC Quad LED fans do not have electrical tape wrapped around the fan. These ball bearing fans are brighter and look cleaner than any other brand.

Zalman Noiseless Cooling

$4.75 and up

Use the Zalman NB32J and other Zalman CNPS products to cool your PC noiselessly. Please check our website for the entire selection.

UV Reactive Fans with Quad LEDs

$4.99

Featuring the same quality construction as our regular LED fans, these SVC exclusive fans feature UV LEDs housed in a UV reactive housing.

Flexo Expandable Sleeving

$1.39 for 5 ft.

Expandable sleeving is a great way to organize cables in your computer and gives it a much cleaner look. Over 80 colors and sizes including UV Reactive, Neon, Chrome, and Carbon.

CoolerMaster Aero 7+ CPU Cooler

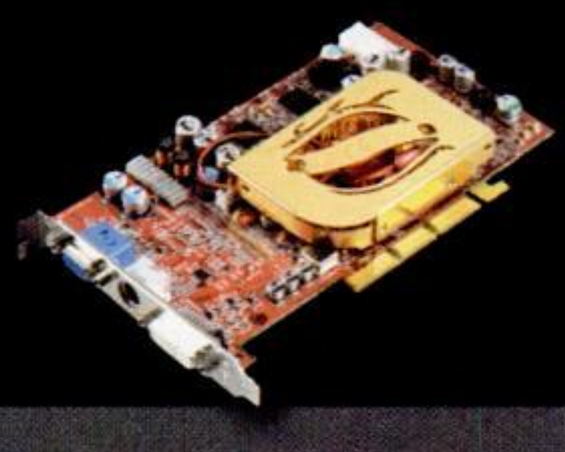
$32.99

Rated as one of the best new CPU coolers, the Aero 7+ is features a variable speed centrifugal blower and a copper skived heatsink for maximum cooling.

Copyrighted material

Harness the performance of the complete range of premium ATi Radeon cards!

Whether you require the flexibility of the 9200, the rock solid 9600, or the extreme unleashed performance of the 9800,
FIC is your #1 ATi source.



Free T-Shirt!

To receive your free FIC Radeon T-shirt:
Cut and mail this coupon along with proof-of-purchase SIN from the retail box to:

ATTN: FICA Radeon T-shirt
FICA of America
5020 Brandin Court
Fremont, CA 94538

Offer good for FIC Radeon 9200, 9600, and 9800 Series purchases only. Valid for first 3000 customer submissions and while supplies last. Limit one per customer.

Name: _____
Address: _____
_____
Phone number: _____
e-mail address: _____
Purchased from: _____

SAMPLE
KK35024 31

FIC RADEON™

First International Computer of America, Inc.
http://www.fica.com email: sales@fica.com

POWERED BY ATi SERIES

Fry's ELECTRONICS Outpost.com **Visit Outpost.com or your nearest Fry's Electronics for more information.**

FIC and the FIC logo are registered trademarks of First International Computer, Inc.
All other company and product names may also be trademarks of their respective companies.

Tech Support Forums www.the-wizards.com/forum/

Computer Wizards

Shop Online or Call 1-(800)-431-3153

www.the-wizards.com

SOHO Diagnostic Kit

Small Office / Home Office Diagnostic Kit

TECHNICIAN X CERTIFIED

Eliminate the Guesswork.

Performance and Value All-in-One.

The SOHO Diagnostic Kit is the latest to be added to our series of diagnostic kits. Equipped with both the QuickTech Personal and WinStress Test, the SOHO Diagnostic Kit is perfect for small office or home use for quick system troubleshooting. Engineered with such advanced features as Self-Boot Technology (SBT) support, the SOHO Diagnostic Kit makes troubleshooting quicker and easier than ever!

Quick. Simple. Accurate.

"This one could serve as a model for all PC Diagnostic tools- fast, small, OS-Independent, easy to run, and quick to provide detailed and useful output."

Robert Luhn
Maximum PC Magazine

GSA Contract Number GS-35F-0260L

ULTRA-X, INC.
www.uxd.com

For more information:
1-888-722-3734
Fax: 1-909-946-7639 Email: sales@uxd.net

Become a PC Repair Technician with at-home training

By learning at home to maintain and repair PCs, you can earn up to $48,000 a year.* And you'll be in high demand in this growing field — there are expected to be 14% more job openings for trained PC Repair Technicians by 2010.**

With nationally accredited Education Direct, all learning materials and equipment are shipped to your door, and you learn in the comfort and privacy of your own home. Step-by-step lessons make learning easy but, if you have questions, you'll get unlimited help from instructors who are available by phone or e-mail.

For FAST & FREE information with no obligation,
Call **1-800-572-1685, ext. 3743**
or visit **www.EduDirect-usa.com** Enter ID# AFYT83S, or simply return the coupon below.

*All salary information is based on the *Occupational Outlook Handbook*, a publication of the U.S. Department of Labor. Individual student earnings vary.

**Growth figures represent a ten-year period ending 2010. Source: *National Industry-Occupation Employment Matrix*, a publication of the U.S. Bureau of Labor Statistics.

V325B

THOMSON EDUCATION DIRECT

Dept. AFYT83S
925 Oak Street, Scranton, PA 18515-0700

Send For Free Facts!

Yes, I want free information on at-home career training for the program I've checked below. I understand there is no obligation. (Please check only one program.)

- ☐ **27 PC Repair**
- ☐ 403 Internet Multimedia & Design
- ☐ 402 Web Programming
- ☐ 38 PC Specialist
- ☐ 404 E-Commerce Administration
- ☐ 105 Computer Graphic Artist
- ☐ 36 Visual C++® Programmer
- ☐ 82 Java® Programmer
- ☐ 83 Web Page Designer
- ☐ 44 A+® Certification Test Prep.*

*Certificate Program

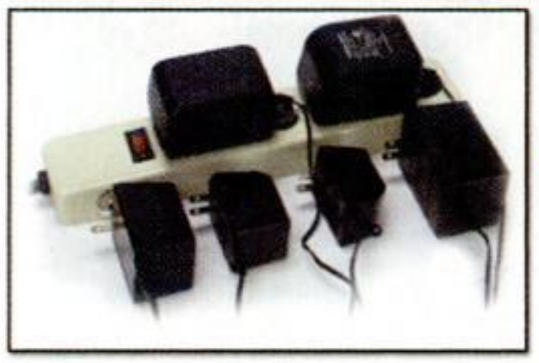
Name _____

Street _____ Apt# _____

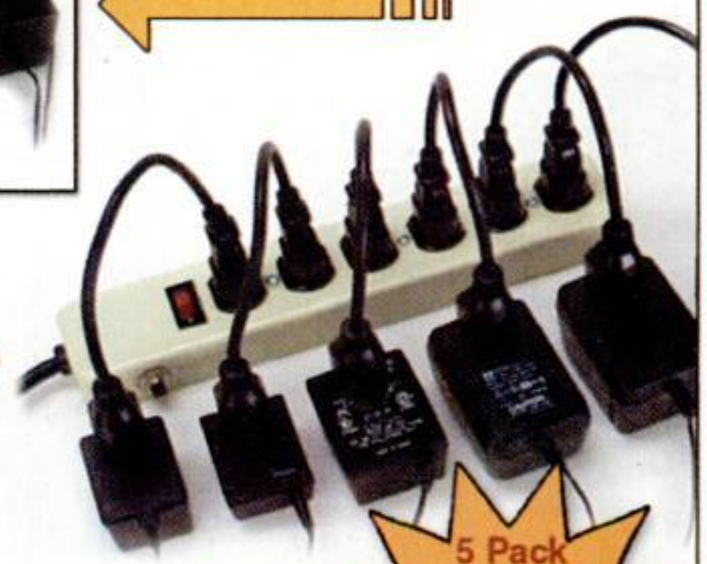
City _____ State _____ Zip _____

Phone ( ) _____ E-mail _____

STOP WASTING OUTLETS!



TURN THIS...



...INTO THIS

WITH THESE!

5 Pack of Liberators
$8.95
#121 2535

POWER STRIP LIBERATOR

Get the full use of your power strips and UPS outlets with our high-quality adapter cable. Just plug those big bulky power adapters into our cables and plug the cables into those previously unusable outlets! Keycode 426-3501

CYBERGUYS!
Your low cost computer accessory & supply source!

ORDER NOW!
800-892-1010
cyberguys.com

Ask for your FREE catalog

Copyrighted material

AD INDEX

For more information on MAXIMUM PC advertisers' products and services, please contact the companies below:

COMPANY	CONTACT	PAGE
ABS Computers	www.buyabs.com	76.77
Activision	www.activision.com	9
AlienWare	www.alienware.com	C3.C6
Am-comps.com	www.am-comps.com	70
Atacom.com	www.atacom.com	82
Coast to Coast Memory	www.18004memory.com	95
CompuExpert	www.gogamer.com	95
CompUSA	www.compusa.com	55
Computer Wizards	www.the-wizards.com	93
Creative Labs	www.creativelabs.com	4
Crucial Technology	www.crucial.com	15
Cyberguys	www.cyberguys.com	93
Cyberpower	www.cyberpowerpc.com	87
Danger Den	www.dangerden.com	94
Dell Computer Corporation	www.dell.com	20.21
Ebuyer	www.ebuyer.com	86
Eidos	www.eidos.com	C2.1
Fat Cow Web Hosting	www.fatcow.com/maxpc	95
First International Computer of America	www.fica.com	92
ibuypower.com	www.ibuypower.com	85
ibuypower.com	www.ibuypower.com	89

COMPANY	CONTACT	PAGE
Maingear	www.maingear.com	80
Micro 2000	www.micro2000.com	95
Monarch Computer	www.monarchcomputer.com	83
MSI Computers	www.msicomputer.com	90
Newegg.com	www.newegg.com	78.79
PC Power & Cooling Inc.	www.pcpowercooling.com	6
PowerON Computer Services	www.poweron.com	95
Shuttle Computer Group	www.shuttle.com	81
Silicon Valley Compucycle	www.svc.com	91
Sony Electronics	www.sony.com/di	2.3
Sony Electronics	www.sony.com/di	12.13
TDK Electronics Corp.	www.tdk.com	19
Thompson's Computer Warehouse	www.tcwo.com	71
Thomson Education Direct	www.EduDirect-usa.com	73
Thomson Education Direct	www.EduDirect-usa.com	93
ThorTek Corp. (HardDrive.com)	www.harddrive.com	74.75
Ultra-X, Inc.	www.uxd.com	93
Velocity Micro	www.velocitymicro.com	84
Videoguys.com	www.videoguys.com	88
ViewSonic Corporation	www.viewsonic.com	39

MAXIMUM PC (ISSN 1522-4279) is published monthly by Future Network USA, 150 North Hill Drive, Suite 40, Brisbane, CA 94005, USA. Periodical class postage paid in Brisbane, CA, and at additional mailing offices. Newsstand distribution is handled by Curtis Circulation Company. Basic subscription rates: one year (12 issues) US: $20, Canada: $26; Foreign: $42. Basic subscription rates "Deluxe" version (w/CD): one year (12 issues/12 CD-ROMs) U.S.: $30; Canada: $40; Foreign $56. US funds only. Canadian price includes postage and GST (GST#R128220688). Postmaster: Send changes of address to Maximum PC, P.O.Box 5159, Harlan, IA 51593-0659. Standard Mail enclosed in the following edition: B. Ride-Along enclosed in the following editions: C, C1, C2, C3, C4, C5. Int'l Pub Mail# 0781029. For customer service, write Maximum PC, P.O. Box 51479, Boulder, CO 80328-1479; Maximum PC, 150 North Hill Drive, Brisbane, CA 94005. Future Network USA also publishes PC Gamer, PSM, MacAddict, and Official Xbox. Entire contents copyright 2003, Future Network USA. All rights reserved. Reproduction in whole or in part is prohibited. Imagine Media Inc. is not affiliated with the companies or products covered in Maximum PC. PRODUCED AND PRINTED IN THE UNITED STATES OF AMERICA.

Copyrighted material

We Can Beat All Prices on Memory then Call Around CALL US!!

www.1800-4-MEMORY.com
1-800-4-MEMORY
1-800-463-6679

SEE OUR NEW HYPERSPEED MEMORY BY 1-800-4-MEMORY

FREE T-Shirt with $100 HyperSpeed Memory purchase

Looking to save on Games?
Look no further....Go to where gamers go!

GoGamer.com

Play More, Pay Less

Best Selling Titles...visit us @ www.gogamer.com

Great Hosting. No Bull.

Only $8.25 per Month*

FatCow™

Mini Moo
- Domain name parking
- 1 email account
- Coming soon page
- $20 domain names

$5 a year

The $99 Plan
- 100MB disk space
- 100 email accounts
- 5GB monthly trans.
- Shopping Cart
- CGI, PHP, MySQL

Udderly Fantastic Web Hosting

*Based upon one year $99.00 annual fee, due at signup

www.fatcow.com/pc
Toll Free 1-866-506-9566

Become a reseller
call 1-866-544-9343 x 5008

POWERON COMPUTER SERVICES
Phone: 800-673-6227 Fax: 916-677-6228

20% restocking fee on all Returned/Refused items. ALL PRODUCTS are USED and/or REFURBISHED unless otherwise noted.
90 day PowerON warranty. All brands and product names are registered to their respective holders and are respectfully acknowledged.
All computers come ready to load your own OS. No OS is installed by PowerOn Computer Services.

Laptop DEALS

Compaq Armada M300 PII/333	$249.99
Compaq Armada 1750 PII/366	$299.99
Compaq Armada M700 PIII/500	$499.99
Dell Latitude CPx PIII/500	$499.99

TiVo DEALS

Series 1 Refurbished 20Hr	$159.99
Series 1 Refurbished 120Hr	$239.99

Complete Systems Starting at: $134.97

Desktop DEALS

Dell Optiplex Cel/466 128/6.4/CD	$59.99
Dell Optiplex PII/400 128/6.4/CD	$69.99
Compaq Deskpro PIII/650 192/10/CD	$189.99
Dell Optiplex Tower PIII/550 128/9.1	$129.99

http://www.poweron.com

Three Powerful Tools to Get Your IT Career in Gear

Micro 2000's A+ Certification Course
Contains extensive training guides, 3 hours of instructional video, and 7 hours of realistic simulations. This A+ course is CAQC certified and a CompTIA authorized curriculum.

The course also includes a full retail copy of Micro-Scope, the award winning PC diagnostic used by the professionals in the industry. Micro-Scope is O/S independent for pinpoint accurate results!

Micro 2000's Network+ Certification Course
Contains four detailed training volumes, and hours of instructional video and simulations. This course is CAQC certified and a CompTIA authorized curriculum.

This course also includes a five seat academic version of RemoteScope, a powerful network administration tool designed to help you easily control your network.

CALL NOW 1-800-436-1708

Order either of the above courses and get EraserDisk free! (a $39.95 value)

Low Level Format any Hard Drive, any Type, any Manufacturer.

Low level format your hard drives with EraserDisk, the professional disk erase tool designed to perform a factory-style low level format on any fixed disk regardless of type or size. Includes Secure Wipe feature that erases and declassifies the hard drive. The perfect solution for preventing your data from being recovered from an old discarded drive.

MICRO 2000, INC. * 1100 E. BROADWAY * 3RD FLOOR * GLENDALE, CA 91205 * WWW.MICRO2000.COM * 818-547-0125

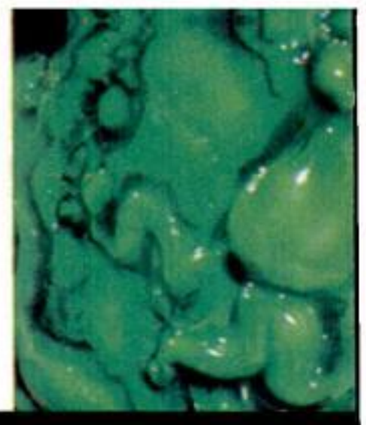
Micro2000 EVERYTHING'S UNDER CONTROL

Copyrighted material

MAXIMUM PC Rig of the Month

Fueled by BAWLS

Mod. Overclock. Never Sleep!



THIS MONTH: Paul Capello's Biohazard: Toxic Case Mod

It's the first case mod to come our way with a back story. According to Paul Capello, the case's creator: "An oversight in management left this unattended and in storage with a live culture inside. The unit has experienced a severe breach and the results are obvious." We'll say! It's hard to believe that this threatening collection of rusty metal and oozing, gooey contaminant is at its core a standard issue "Color Case" that's been subjected to some skillful arts and crafts.

Fed up with the generic biohazard cases being pimped on countless web sites, Paul was inspired to infuse his rig with a bit more character. Making liberal use of model kits, auto parts, and sundry dime-store hoo-ha, Paul has single-handedly raised the bar set by the ubiquitous "Biohazard" sticker.

It's no wonder Paul's representation is so convincing; he previously worked on feature films building sets and props. As he puts it: "In order to build props I had to be a magician and know how to use many types of material. Having sculpting and casting skills allows me to create objects that are realistic-looking, yet lightweight and very strong." Indeed. The unit's oozing goo was sculpted from clay, cast in a polymer resin, and then painted with a mixture of epoxy and fluorescent paint to give it a wet look. Still, that and the rig's many other mods add just four or five pounds to the case's original weight.

Paul pulled a number of tricks out of his sleeve to accelerate the corrosion process. First the case was sanded to bare metal, then a stucco-like layer of Bondo was applied to the surface. That was followed by bright silver paint, which was then treated with a faux-rust kit. On top of all that, Paul added depth and detail with airbrushing. And, folks, that was just the beginning.

Nothing spells danger like a human skull. This one was made from a model kit, and then—believe it or not—bonded to a plastic clock face that serves as a case window.

Various pieces of plastic and a couple 12-volt automotive strobe lights make up the containment apparatus. Red and green "status" lights can be activated via a switch for added bling.

These dials and knobs may look capable of life-or-death operations, but they in fact control the case and CPU fans along with some of the decorative lights.

For his winning entry Paul Capello wins $500 and a case of BAWLS to fuel his late nights of modding

If you have a contender for Rig of the Month, e-mail **input@maximumpc.com** with pics and a brief write-up.

Copyrighted material

ahead of the game.

Introducing the latest innovation from Alienware® - the new face of high-performance gaming. The unrivaled performance and reliability of Alienware® systems are now matched with truly unique styling. Custom-built with the highest quality components available and backed by award-winning customer support, Alienware® systems offer the best gaming experience money can buy.

Prices, configurations, and availability may change without notice. Monitor and speakers sold separately. Taxes and shipping charges not shown. Alienware can not be held responsible for errors in photography or typography. On-site service may be provided via contracted third party, service not available in all areas. Technician will be dispatched if deemed necessary following telephone-based troubleshooting. For complete information on warranty, support, and on-site service, visit www.alienware.com. For hard drives, GB means 1 billion bytes and accessible capacity may vary depending on configuration. For CD-ROM, DVD-ROM, CD-RW, and DVD+RW/+R drive(s), maximum data transfer rates may vary and discs created with these drives may not be compatible with all drives and players. For modems and network cards/hardware, maximum achievable data transfer rates may vary. Actual case may vary in design. Award(s) and quote(s) listed do not pertain to a specific system or configuration. *Subject to credit approval. Minimum monthly payment required during the 6-month period. Finance charges accrue from the date of the sale unless the Same As Cash plan balance is paid in full prior to the Same As Cash expiration date. Regular credit terms apply after Same As Cash period. Terms subject to change without notice. See agreement for complete information. Annual Percentage Rate: 21.90%. Minimum finance charge: $1.00. **This applies only to purchases made direct with Alienware and shipping within the U.S., except for those shipping to Florida. Corporate purchases are not exempt from use taxes within their own states. Orders shipping to Florida must pay all state and local sales taxes. All registered trademarks and trademarks are the property of their respective owners.

To Receive an $85 Instant Rebate and View the Latest Pricing and Promotions, Enter an AccessID at:

WWW.ALIENWARE.COM/MPC

1-800-ALIENWARE

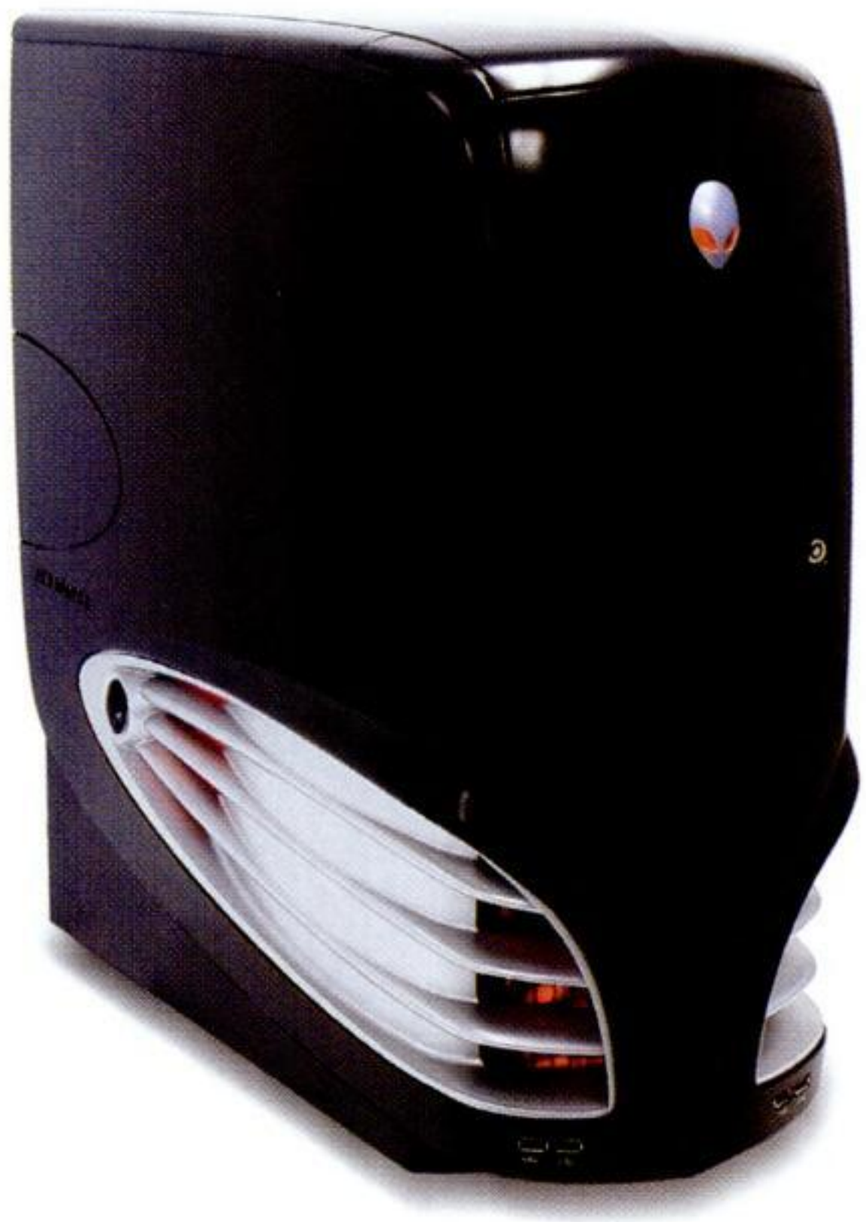
(1-800-254-3692)

Copyrighted material

"Incredible pricing, no-excuses performance, and an unforgettable design aesthetic."

-Maximum PC

MAXIMUM PC KICK ASS PRODUCT



6 MONTHS
SAME AS CASH*
FINANCING

AREA-51™ DESKTOPGAMING EXTREME OPTION

- **NEW! Intel® Pentium® 4 Processor at 3.2GHz with HT Technology**
- **Advanced 800MHz System Bus and 512KB Cache**

Intel® 875P Chipset-Based Motherboard
1024MB Dual-Channel PC-3200 DDR SDRAM at 400MHz
120GB 7200RPM Serial ATA-150 Hard Drive 8MB Cache

- **NEW! NVIDIA® GeForce™ FX 5900 Ultra 256MB Graphics Card with DVI and S-Video Out**
- **NEW! Exclusive Alienware® Case with 420-Watt PS**
- **NEW! Fusion Red AlienIce: Video Cooling System**
- **NEW! Alienware® 16MB USB 2.0 Flash Drive**

High-Performance Heatsink-Cooling System

- **Creative Sound Blaster® Audigy 2™ 6.1 Advanced 24-bit Audio**
- **NEW! Black 52X/24X/52X/16X CD-RW/DVD Combo Drive**

Space Black Microsoft® Internet Keyboard
Space Black Microsoft® IntelliMouse Explorer 3.0
Intel® Gigabit Ethernet Adapter
Microsoft® Windows® XP Professional Edition
Personalized Owner's Manual
FREE Exclusive Alienware® T-Shirt
FREE Alienware® fUnc™ Surface Pad

- **AlienAdrenaline: Video Performance Optimizer**

Optimized & Configured for High-Performance

- **AlienAutopsy: Automated Technical Support**
- **AlienCare: Advanced Gaming Technical Support including:**

Lifetime Personalized Online Support Portal
1-Year Toll-Free 24/7 Phone Support by Alienware Technicians
1-Year On-site Home Service

$2,899.00 as low as $87/mo.*

- **Pay No Sales Tax****

ACCESSID: MPC0803GA3

AREA-51™ DESKTOPGAMING ENTHUSIAST OPTION

- **NEW! Intel® Pentium® 4 Processor at 3.0GHz with HT Technology**

512MB Dual-Channel PC-3200 DDR SDRAM at 400MHz

- **NEW! NVIDIA® GeForce™ FX 5600 Ultra 128MB Graphics Card with DVI and S-Video Out**

Microsoft® Windows® XP Home Edition

$1,999.00 as low as $60/mo.*

- **Pay No Sales Tax****

ACCESSID: MPC0803GA2

AREA-51™ DESKTOPGAMING PERFORMANCE OPTION

- **NEW! Intel® Pentium® 4 Processor at 2.8GHz with HT Technology**

512MB Dual-Channel PC-3200 DDR SDRAM at 400MHz
80GB 7200RPM Serial ATA-150 Hard Drive 8MB Cache

- **NEW! NVIDIA® GeForce™ FX 5200 Ultra 128MB Graphics Card with DVI and S-Video Out**

Creative Sound Blaster® Audigy™ 5.1 Advanced 24-bit Audio
Microsoft® Windows® XP Home Edition

$1,599.00 as low as $48/mo.*

- **Pay No Sales Tax****

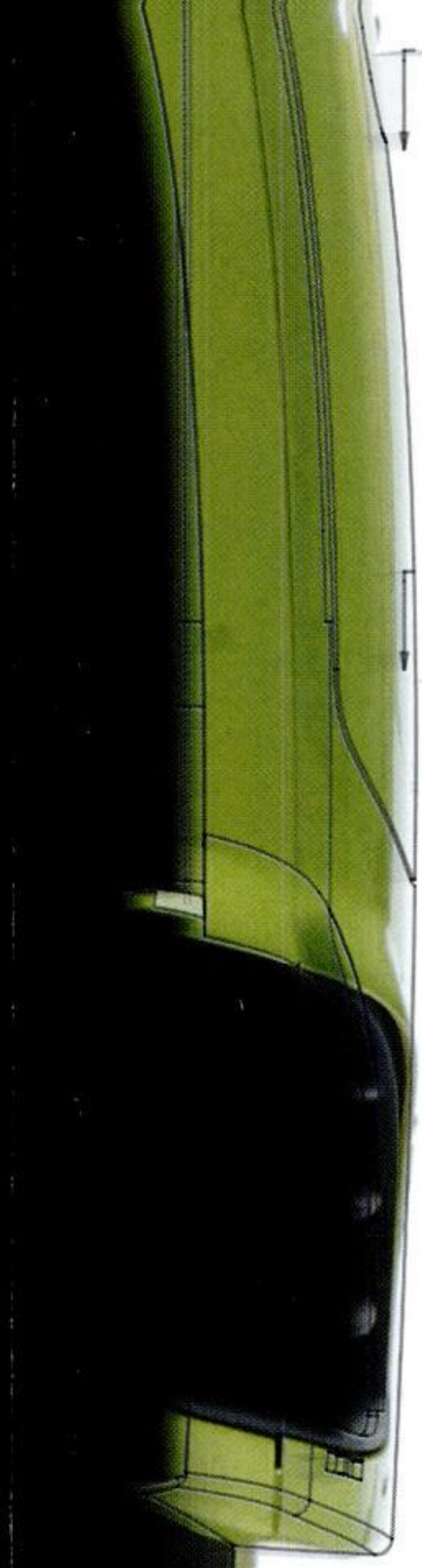
ACCESSID: MPC0803GA1

The way it's meant to be played — NVIDIA.

Alienware® recommends Microsoft® Windows® XP.

ALIENWARE™
THE ULTIMATE GAMING MACHINE™

Copyrighted material



ahead of the game.

Introducing the latest innovation from Alienware® - the new face of high-performance gaming. The unrivaled performance and reliability of Alienware® systems are now matched with truly unique styling. Custom-built with the highest quality components available and backed by award-winning customer support, Alienware® systems offer the best gaming experience money can buy.

Prices, configurations, and availability may change without notice. Monitor and speakers sold separately. Taxes and shipping charges not shown. Alienware can not be held responsible for errors in photography or typography. On-site service may be provided via contracted third party, service not available in all areas. Technician will be dispatched if deemed necessary following telephone-based troubleshooting. For complete information on warranty, support, and on-site service, visit www.alienware.com. For hard drives, GB means 1 billion bytes and accessible capacity may vary depending on configuration. For CD-ROM, DVD-ROM, CD-RW, and DVD+RW/+R drive(s), maximum data transfer rates may vary and discs created with these drives may not be compatible with all drives and players. For modems and network cards/hardware, maximum achievable data transfer rates may vary. Actual case may vary in design. Award(s) and quote(s) listed do not pertain to a specific system or configuration. *Subject to credit approval. Minimum monthly payment required during the 6-month period. Finance charges accrue from the date of the sale unless the Same As Cash plan balance is paid in full prior to the Same As Cash expiration date. Regular credit terms apply after Same As Cash period. Terms subject to change without notice. See agreement for complete information. Annual Percentage Rate: 21.90%. Minimum finance charge: $1.00. **This applies only to purchases made direct with Alienware and shipping within the U.S., except for those shipping to Florida. Corporate purchases are not exempt from use taxes within their own states. Orders shipping to Florida must pay all state and local sales taxes. All registered trademarks and trademarks are the property of their respective owners.

To Receive an $85 Instant Rebate and View the Latest Pricing and Promotions, Enter an AccessID at:

WWW.ALIENWARE.COM/MPC

1-800-ALIENWARE

(1-800-254-3692)

Copyrighted material

INTRODUCING THE NEW

AREA-51m™

Graphics Performance: NVIDIA® GeForce™ FX Go5600 128MB DDR
Architectural Innovation: Upgradeable Video Card Design
Mobile Power: Up to 3.2GHz Processor with 800MHz FSB
Exclusive Design: Magnesium Alloy Chassis and Colors

6 MONTHS
SAME AS CASH*
FINANCING

Featuring the NVIDIA® GeForce™ FX Go5600 - the preferred graphics of Electronic Arts™.

The way it's meant to be played — NVIDIA

To Receive an $85 Instant Rebate and View the Latest Pricing and Promotions, Enter an AccessID at:

WWW.ALIENWARE.COM/MPC

1-800-ALIENWARE

(1-800-254-3692)

Alienware® recommends Microsoft® Windows® XP.

ALIENWARE™
THE ULTIMATE GAMING MACHINE™

Copyrighted material